



PIONEERED BY THE
ROCKEFELLER FOUNDATION



RESILIENT HOUSTON

Resilience Assessment

May 17, 2019

INTRODUCTION

What is urban resilience?

THE 101st RESILIENT CITY

In August of 2018, the 1-year anniversary of Hurricane Harvey, Mayor Sylvester Turner, 100 Resilience Cities – Pioneered by the Rockefeller Foundation and the Shell Corporation joined forces to name Houston as the 101st member of 100 Resilient Cities. Over the past eight months, this partnership has started the Resilience Strategy development process for Houston by:

- Joining the 100RC Network;
- Forming a Strategy Partner team;
- Conducting research on existing efforts, perceptions, and shocks and stresses in Houston;
- Holding an Agenda Setting workshop and a Living with Water workshop;
- Hiring a Chief Resilience Officer;
- Forming a multidisciplinary City Steering Committee for Resilience;
- Tying the Resilience Strategy development process to the Smart Cities Task Force and other ongoing efforts; and
- Developing the following Resilience Assessment to be used in the next phase of the process.

WHAT IS URBAN RESILIENCE?

Urban Resilience

The capacity of individuals, communities, institutions, businesses, and systems within a city to survive, adapt, and thrive no matter what kinds of **chronic stresses** and **acute shocks** they experience.

INTRODUCTION TO SHOCKS AND STRESSES

What are acute **shocks**?

- Cyber attack
- Disease outbreak
- Earthquake
- Extreme temperatures
- Fire
- Hazardous materials accident
- Hurricane
- Infrastructure or building failure
- Insect-borne disease
- Rainfall flooding
- Riot/civil unrest
- Snow/winter storms
- Terrorism
- Tornadoes/wind storms
- Water quality

What are chronic **stresses**?

- Aging infrastructure
- Crime & violence
- Changing demographics
- Climate Change
- Drought/water shortages
- Food shortages
- Economic diversity and vibrancy
- Education quality and access
- Energy affordability/continuity
- Environmental degradation
- Healthcare
- High unemployment
- Homelessness
- Inclusiveness
- Land use & availability

WHAT IS THE CITY RESILIENCE FRAMEWORK?



CITY RESILIENCE FRAMEWORK



Health & Wellbeing

The health and wellbeing of everyone living and working in the city.

Meets basic needs

Supports livelihood & employment

Ensures public health services

CITY RESILIENCE FRAMEWORK



Economy & Society

Organizations that enable urban populations to live peacefully, and act collectively.

Promotes cohesive & engaged economies

Ensures social stability, security & justice

Fosters economic prosperity

CITY RESILIENCE FRAMEWORK



Infrastructure & Environment
Built and natural infrastructure that serves, protects, and connects urban citizens.

Provides & enhances natural & built assets

Ensures continuity of critical services

Provides reliable communications & mobility

CITY RESILIENCE FRAMEWORK



Leadership & Strategy
Effective leadership, empowered stakeholders, and integrated planning.

Provides leadership & effective management

Empowers a broad range of stakeholders

Fosters long-term & integrated planning

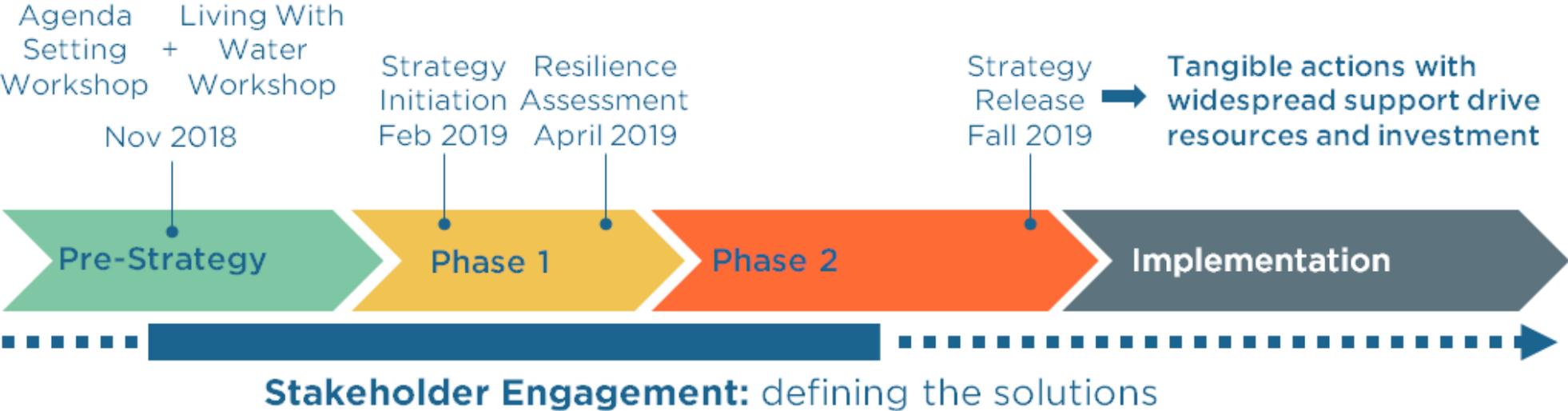
HOW TO USE THE CITY RESILIENCE FRAMEWORK?

Throughout the development and implementation of Houston's Resilience strategy, the City Resilience Framework (CRF) can be used as a tool to:

- 1) Evaluate existing programs and policies;
- 2) Identify areas of strength or weakness;
- 3) Investigate the comprehensiveness of a resilience challenge or proposed solution;
- 4) Organize data; and
- 5) Measure progress.

100 RESILIENT CITIES STRATEGY PROCESS

The **Strategy** is a tactical roadmap to build resilience that articulates the city’s resilience priorities and specific initiatives for short-, medium-, and long-term implementation.



HOUSTON IN CONTEXT

By Region, City, Bayou, Neighborhood, and Houstonian

2,500,000

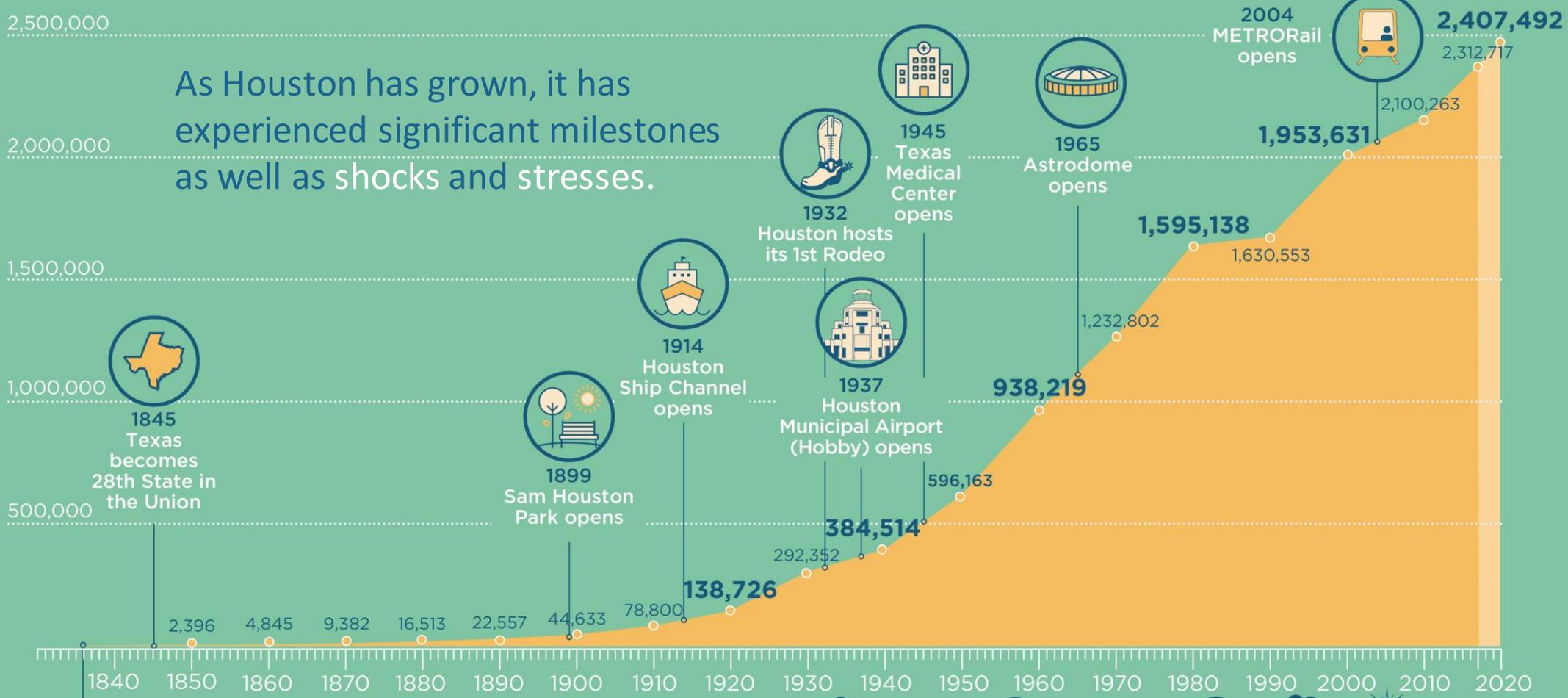
2,000,000

1,500,000

1,000,000

500,000

As Houston has grown, it has experienced significant milestones as well as shocks and stresses.



HOUSTON IN CONTEXT

1836
Allen Brothers found Houston

1900
Great Galveston Hurricane

1935
Massive flood; HCFCD created

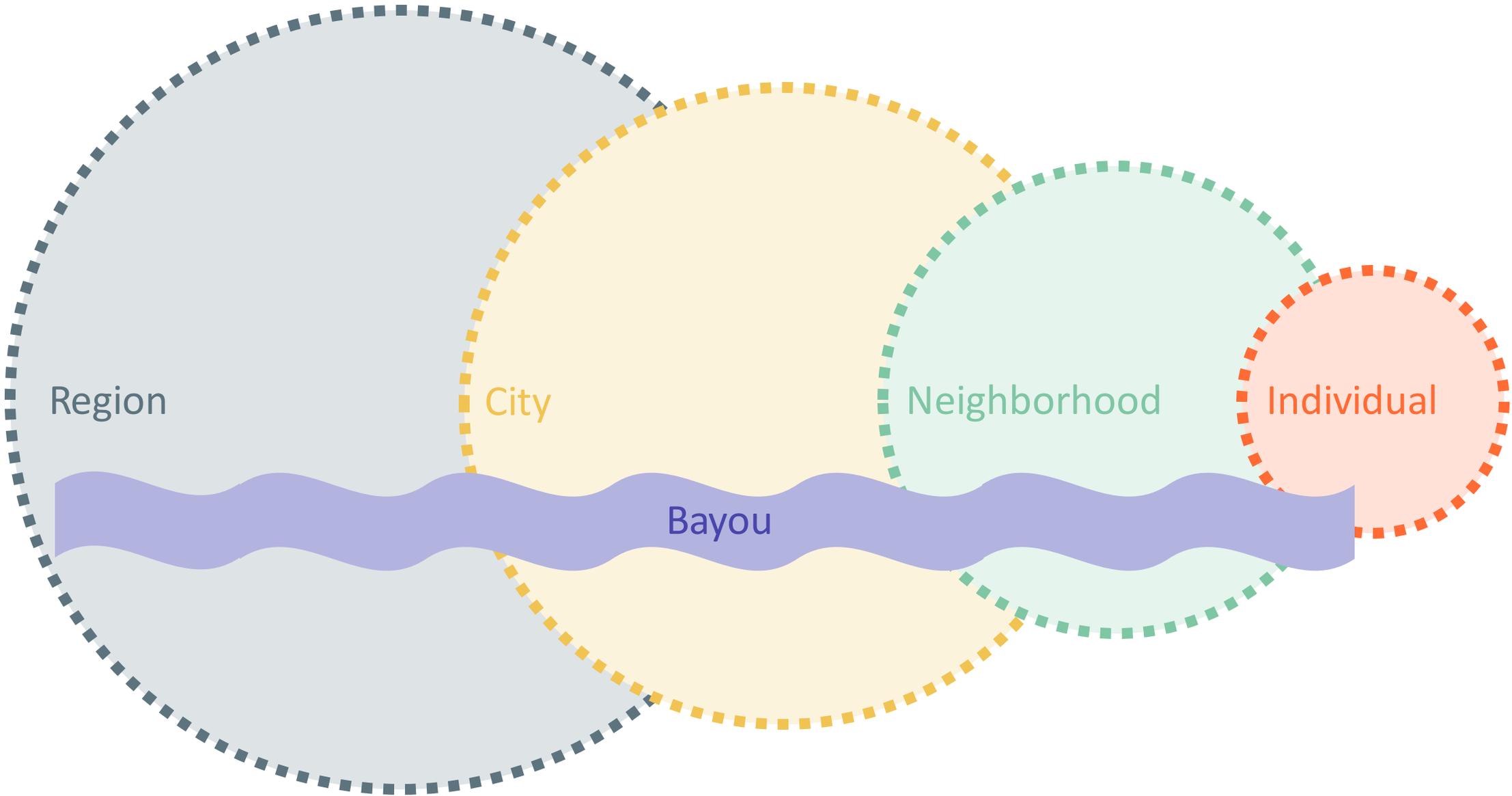
1957
Audrey
1961
Carla

1947
Texas City Explosion

1979
Woodway Square Apartment Fire
1983
Alicia
1989
Phillips Plant
1994
San Jacinto River
1994
Oil/Gas Economic Downturn

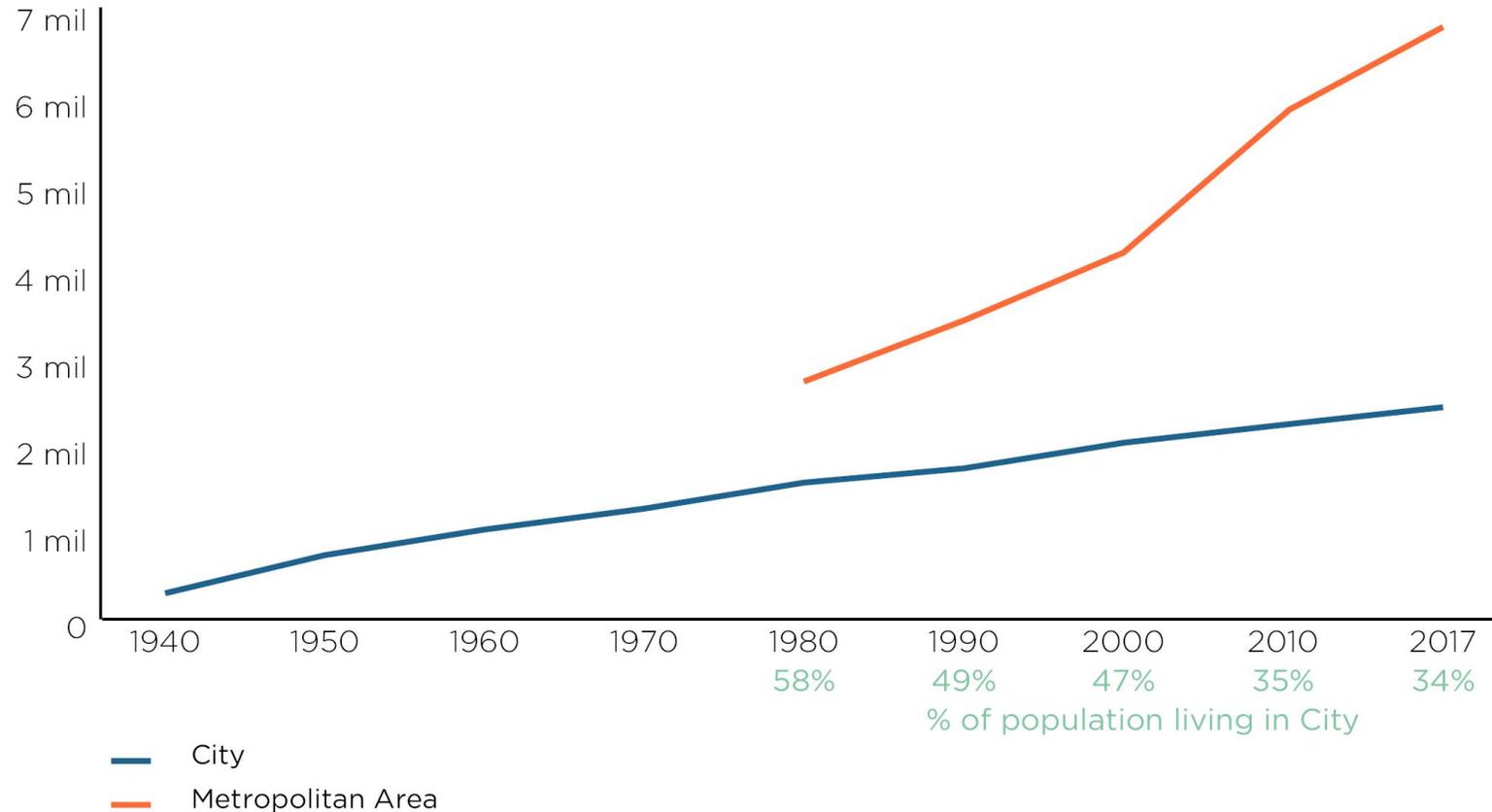
1994
2001
Allison
2005
Texas City
2006
2008
Ike
2009
Seabrook
2011
2015
Memorial Day
2016
Tax Day
2017
Seabrook

FRAMING RESILIENCE AT MULTIPLE SCALES



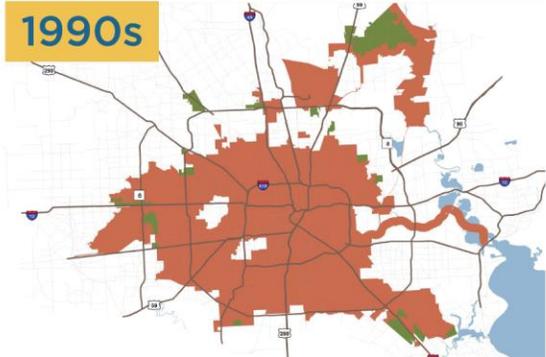
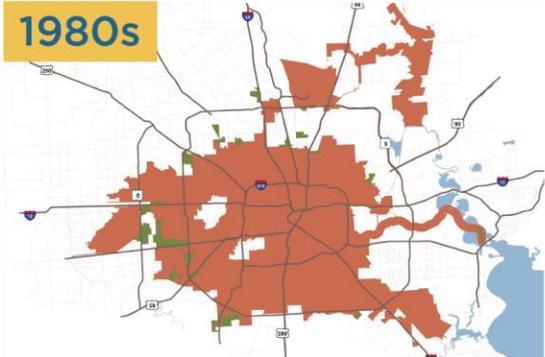
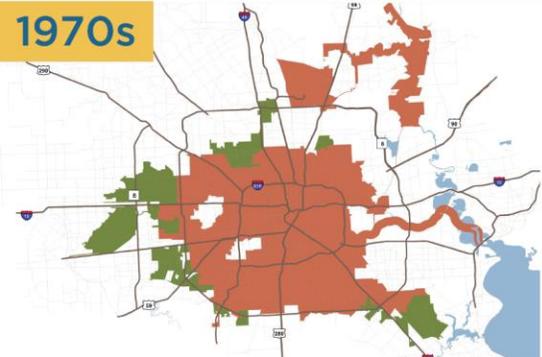
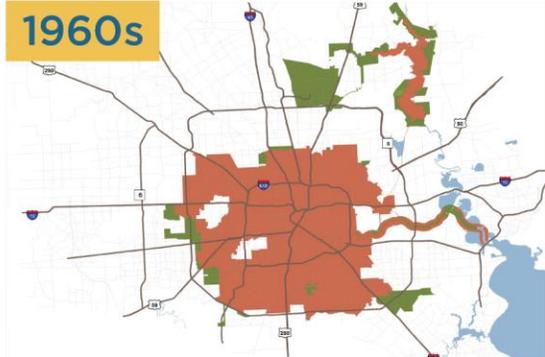
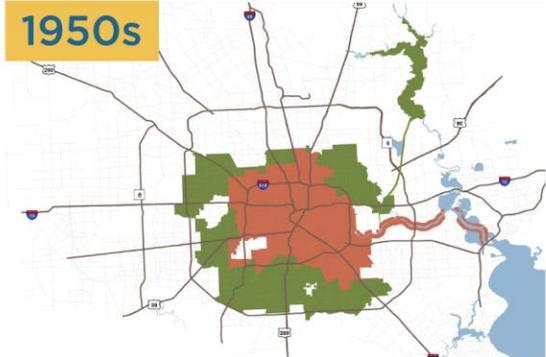
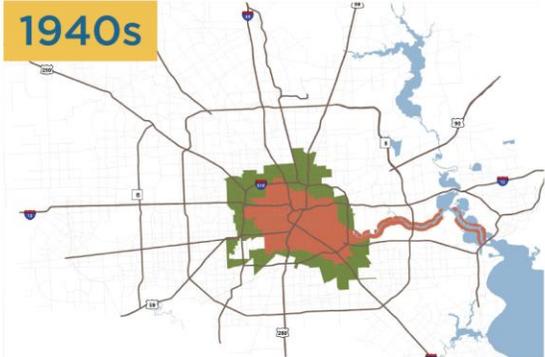
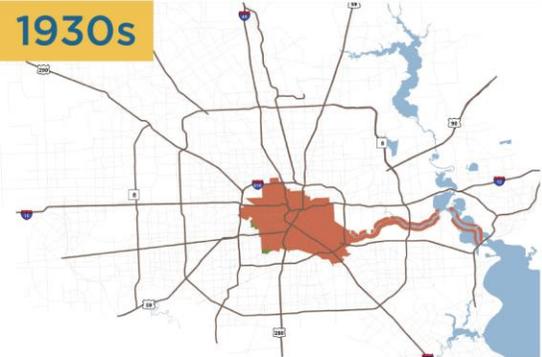
POPULATION GROWTH: METRO & CITY

Population Change



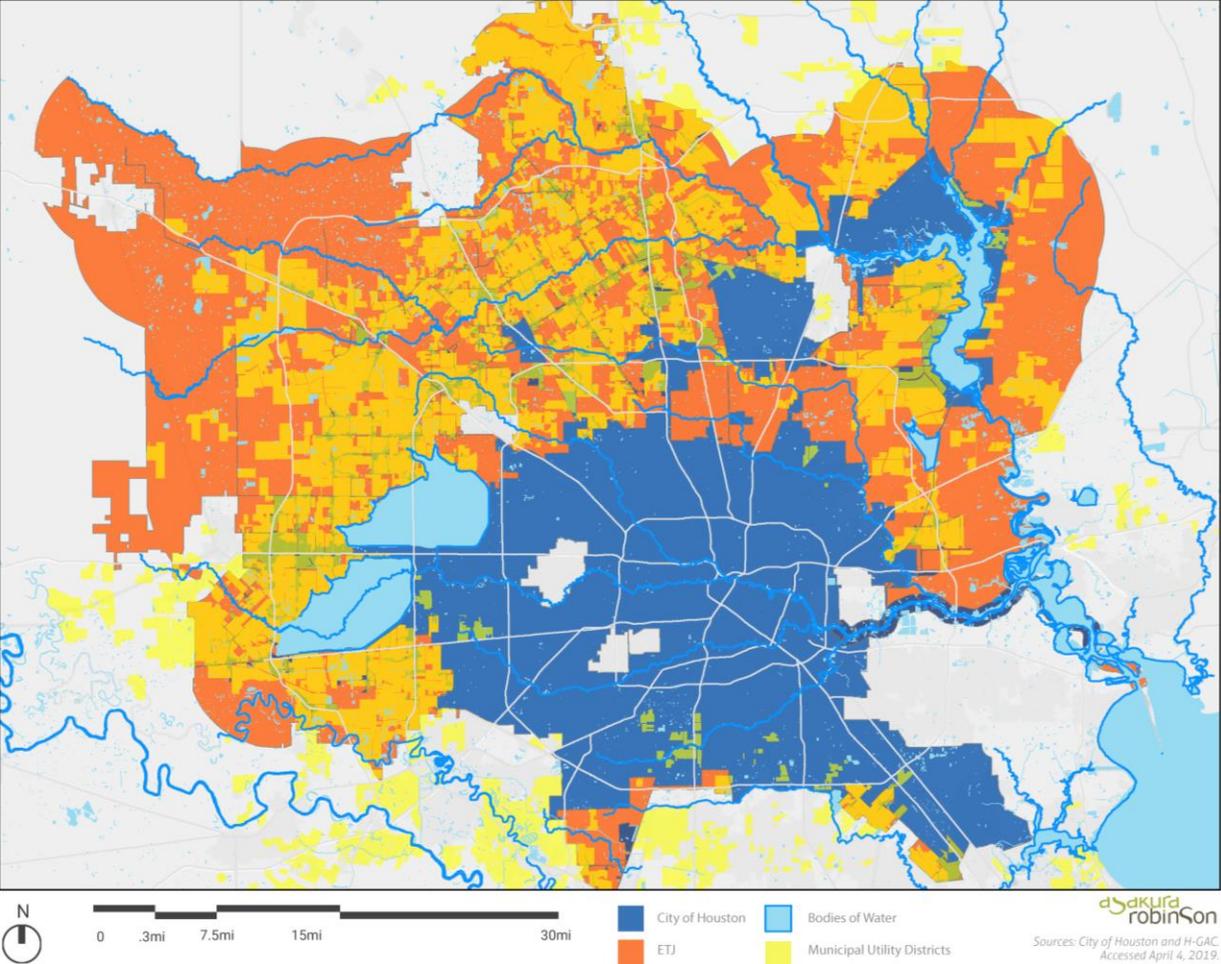
Sources: 1. *Population of the 100 Largest Cities and Other Urban Places in the United States: 1790 to 1990* Archived March 14, 2007, at the Wayback Machine. Campbell Gibson, Population Division, U.S. Census Bureau. Published June 1998. 2. U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates. 3. Texas State Demographic Center. *Population and Population Change for Metropolitan Statistical Areas in Texas, 1980-1990 and 1990-2000*. 4. U.S. Census 2010, Summary File 1, Houston-Sugar Land-Baytown, TX Metro Area. Accessed through the Texas State Demographic Center, March 2019.

HOUSTON HAS GROWN TO 667 SQUARE MILES IN 175 YEARS



Source: City of Houston Planning & Development Department

CITY BOUNDARIES WITH ETJ AND MUDS

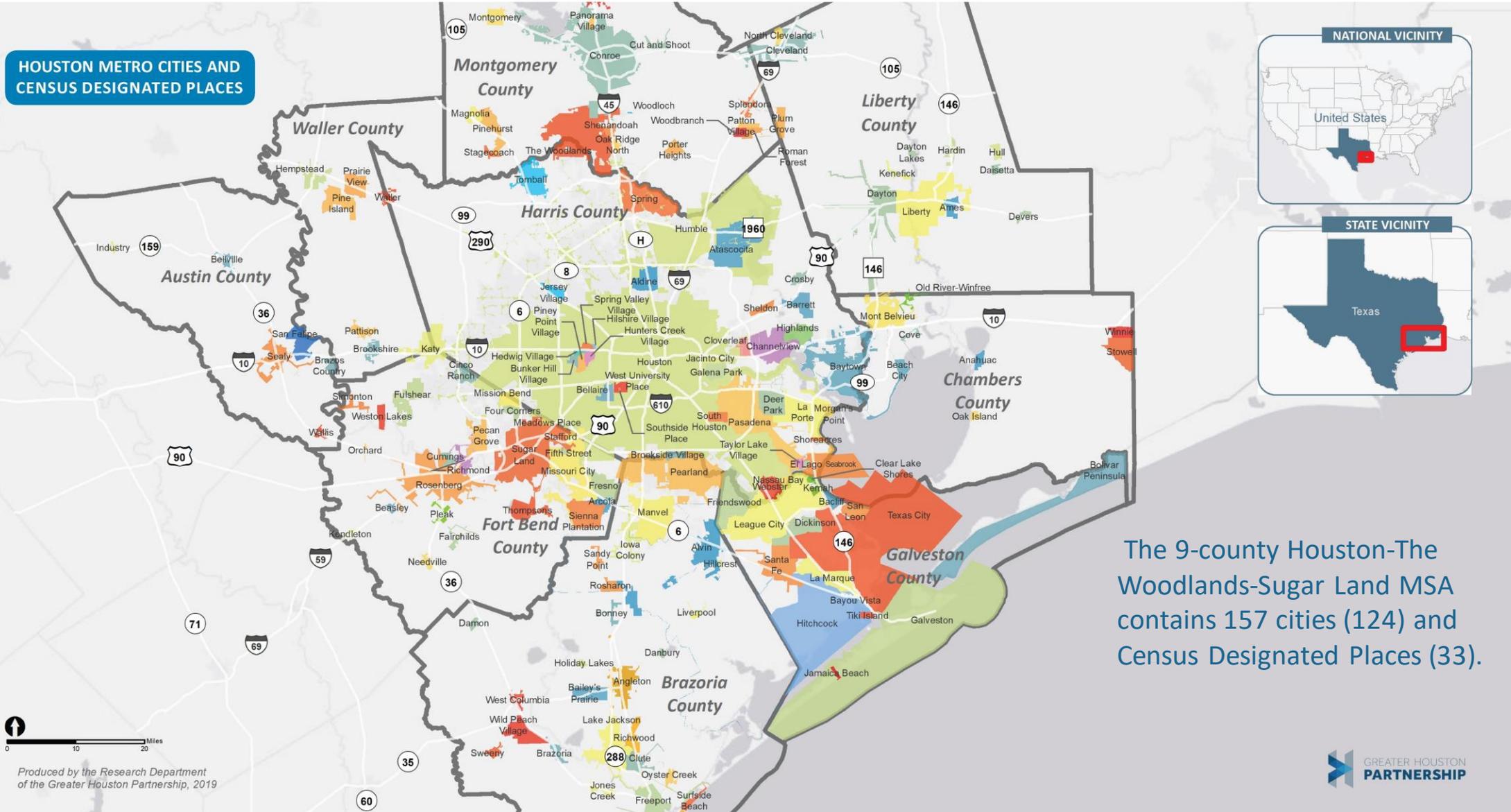


- ~370 Municipal Utility Districts (MUDs) in the Extraterritorial Jurisdiction (ETJ)
- 403 square miles of MUDs in the ETJ
- Over 552,000 Housing Units in ETJ MUDs
- Over 1.5 million Houstonians live in ETJ MUDs
- \$6 Billion in Bond Indebtedness by MUDs in the ETJ
- No major annexations since 1980s

Source: *Governing a Growing Region*. Kinder Institute for Urban Research. 2018

CITIES AND COUNTIES IN THE METRO AREA

HOUSTON METRO CITIES AND CENSUS DESIGNATED PLACES



The 9-county Houston-The Woodlands-Sugar Land MSA contains 157 cities (124) and Census Designated Places (33).

Produced by the Research Department of the Greater Houston Partnership, 2019

CITY OF HOUSTON DAYTIME POPULATION

Houston's daytime population change is the equivalent of the 25th largest city in the United States. It is more than the populations of Nashville, Oklahoma City, Portland, or Las Vegas.

City of Houston	Totals
Resident Population	2,134,707
Workers Living and Working in Houston	999,353
Workers Working (some not living in Houston)	1,654,918
Daytime Population	2,790,272
Daytime Population Change	655,565
Percent Change	31%

Source: Compilation by H-GAC, 2017

Houston is a **MULTI-CENTRIC CITY**, with multiple centers of employment and density.

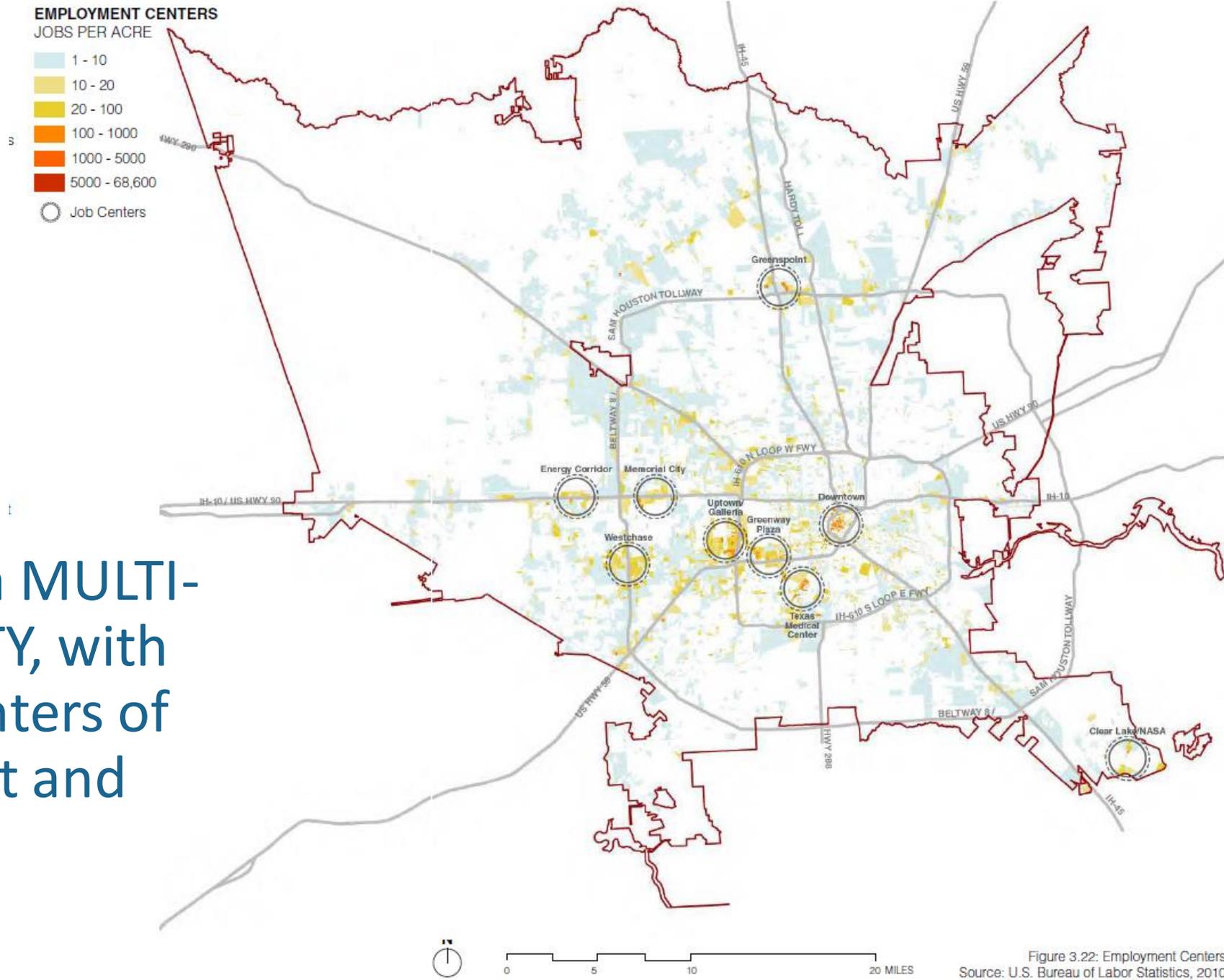


Figure 3.22: Employment Centers
Source: U.S. Bureau of Labor Statistics, 2010

THE BAYOU CITY

Houston's past, present, and future is indelibly tied to its system of bayous.



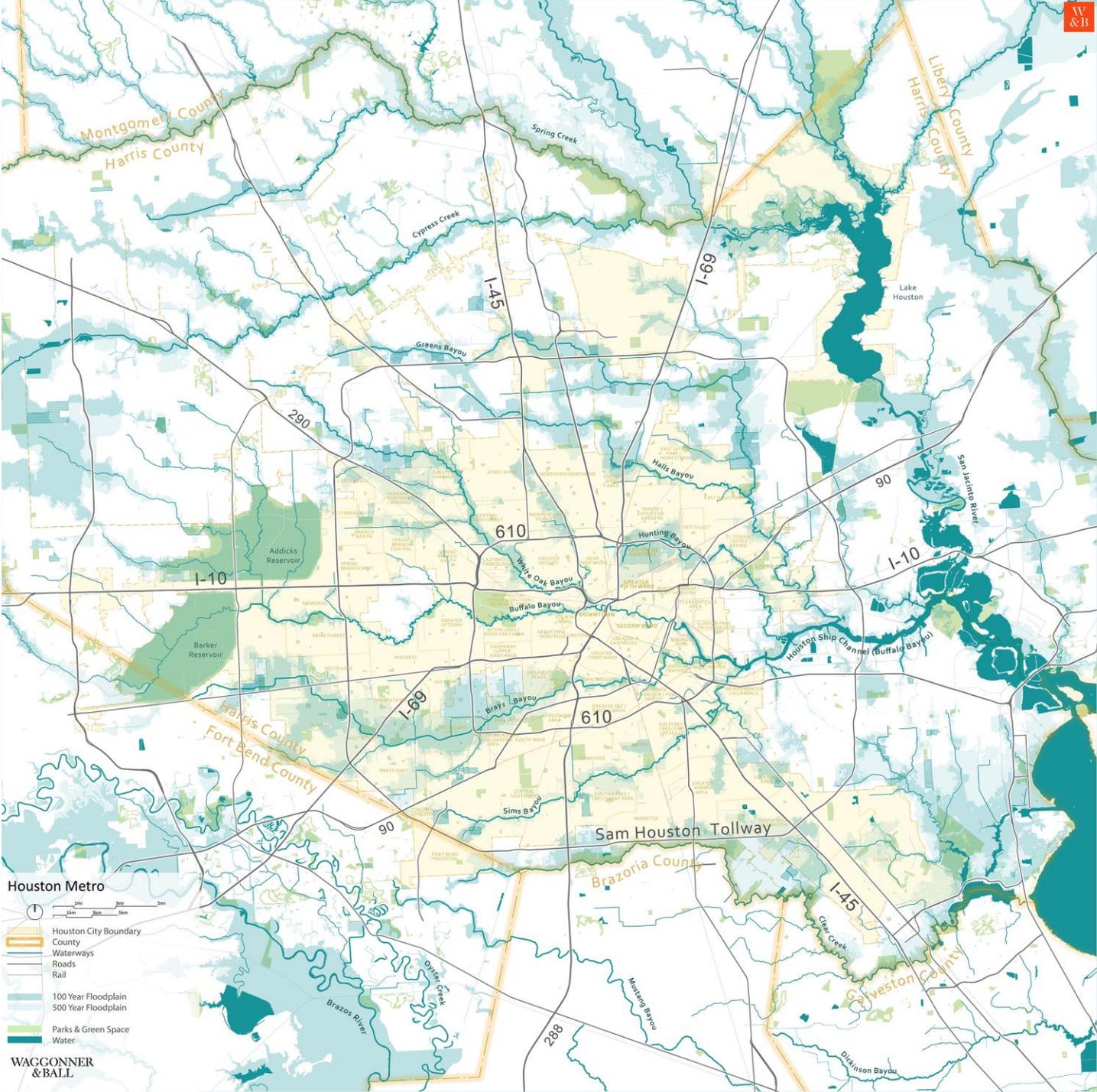
HOUSTON IN
CONTEXT
BAYOU



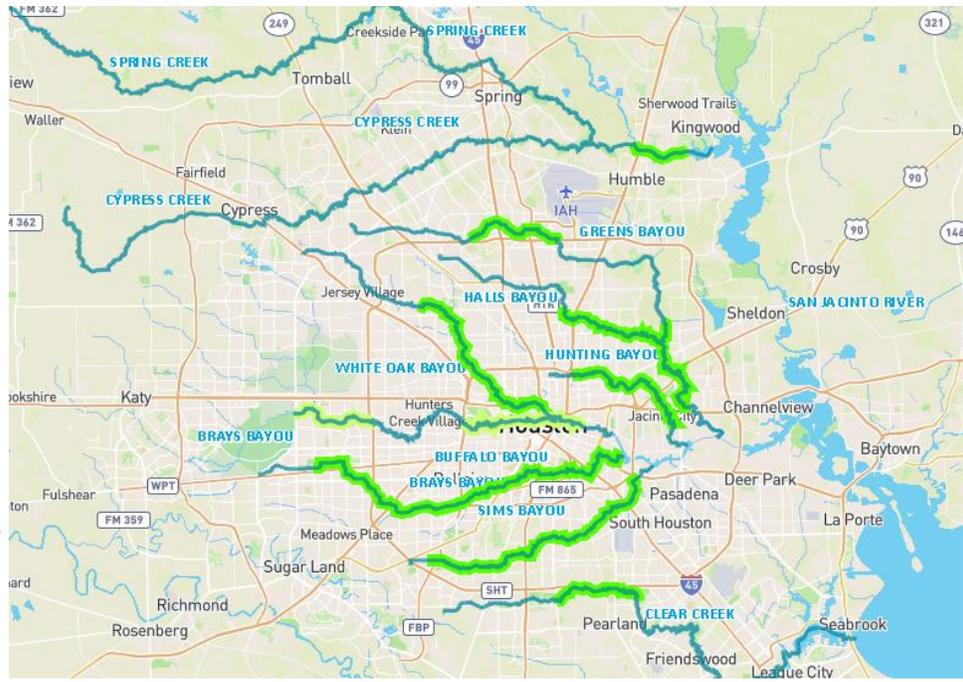
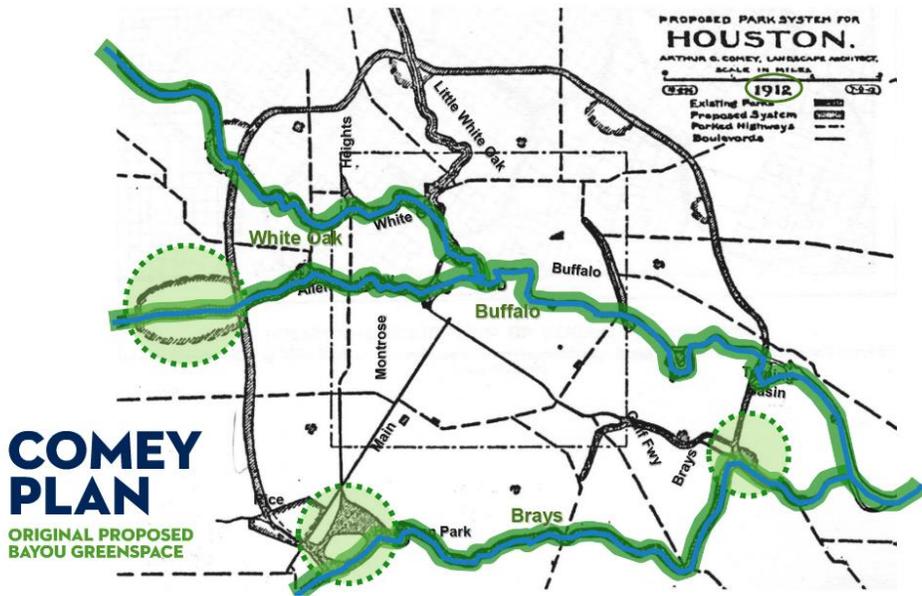
Birdseye view of Houston, 1891

BAYOUS & WATERSHEDS

Houston has 22 bayou systems and waterways.

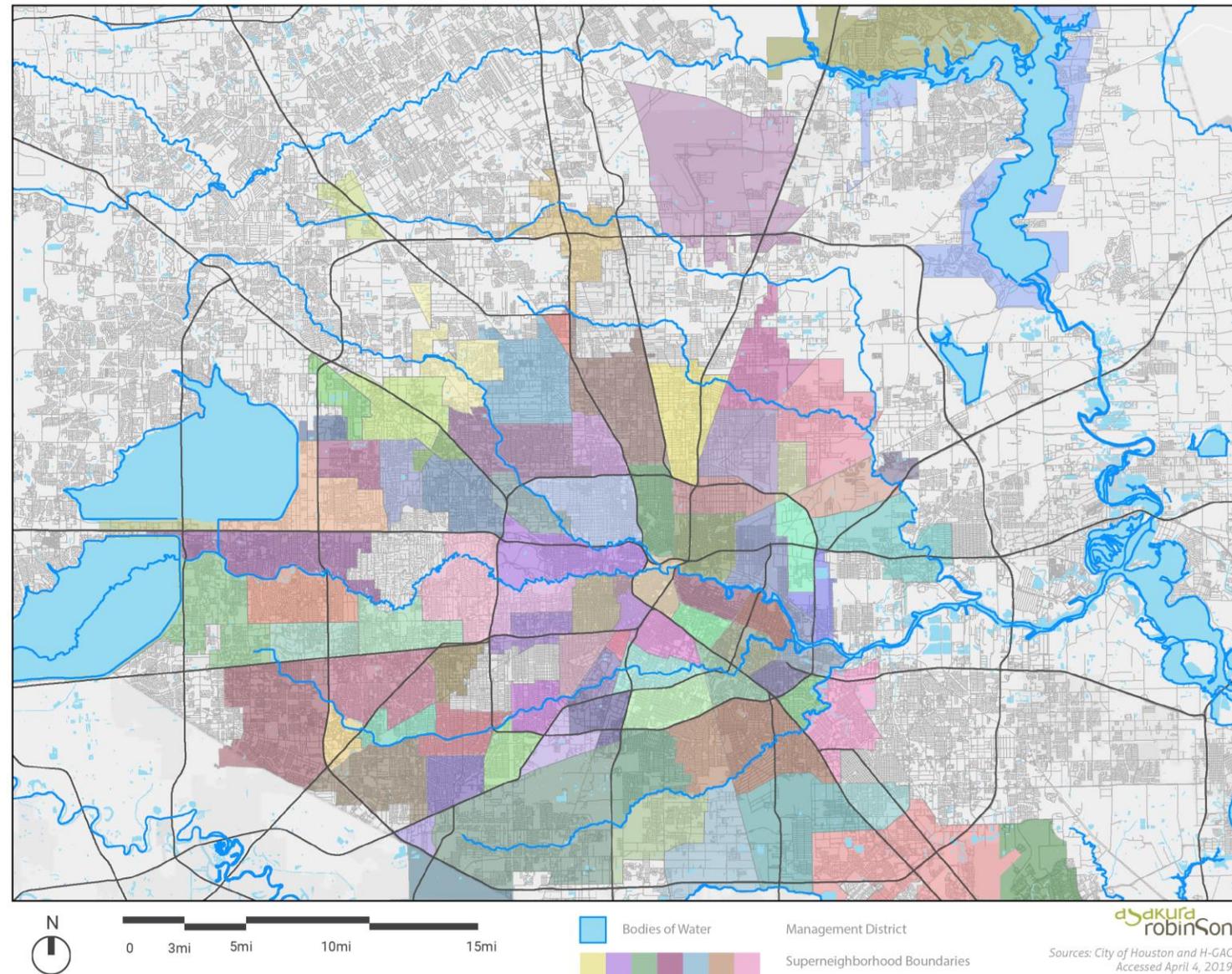


THE FUTURE OF HOUSTON'S BAYOUS AND WATERSHEDS



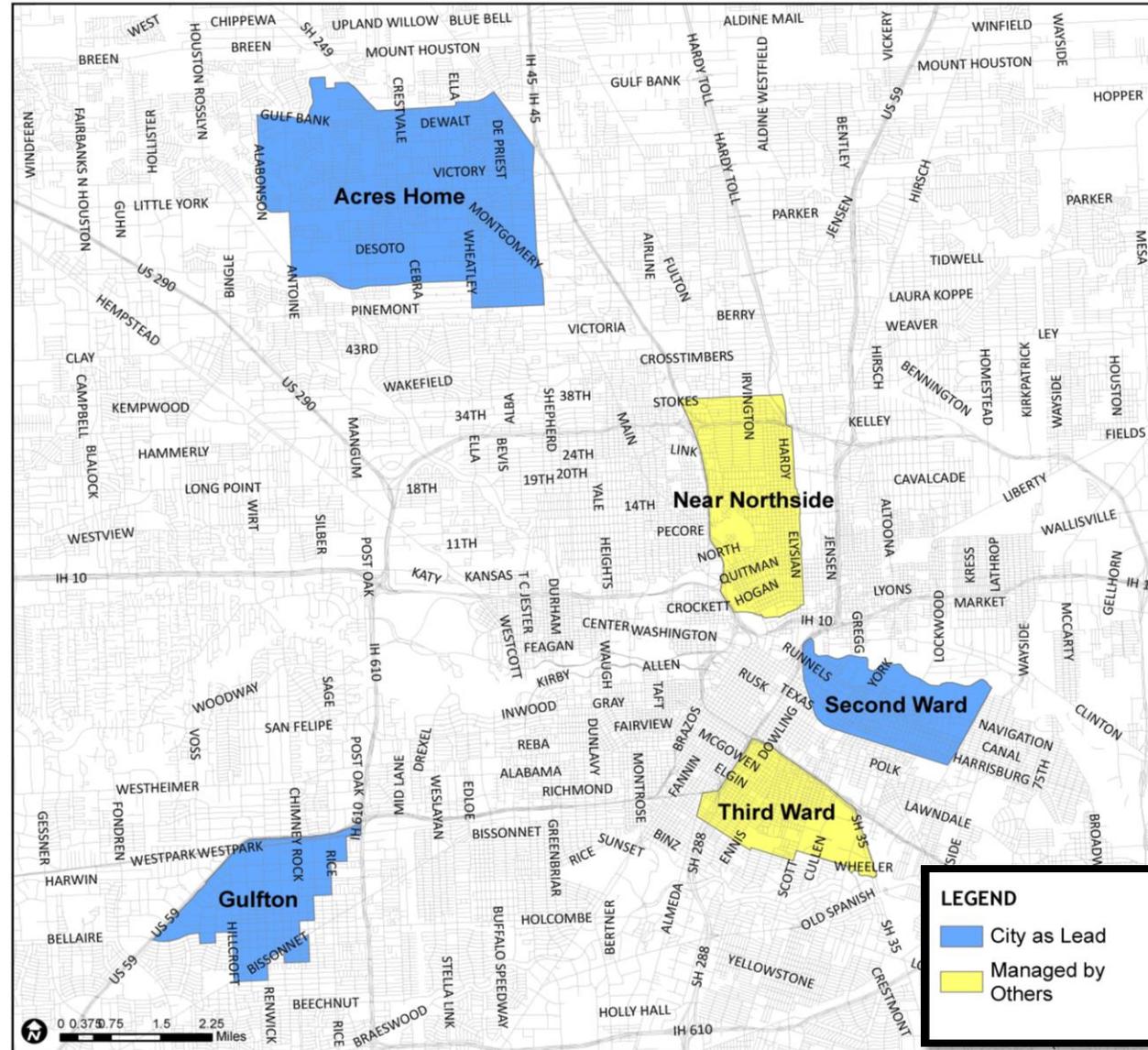
HOUSTON'S NEIGHBORHOODS

Houston has been divided into 88 SUPER NEIGHBORHOODS where residents of neighboring communities are encouraged to work together to identify, plan, and set priorities to address the needs and concerns of their community.



HOUSTON'S COMPLETE COMMUNITIES

Through its COMPLETE COMMUNITIES initiative the City of Houston is working to revitalize its under-resourced communities. Action Plans for the original pilot communities - Acres Home, Gulfton, Second Ward, Near Northside, and Third Ward – were adopted in August 2018, and the City is preparing to announce the next communities to participate in the program.

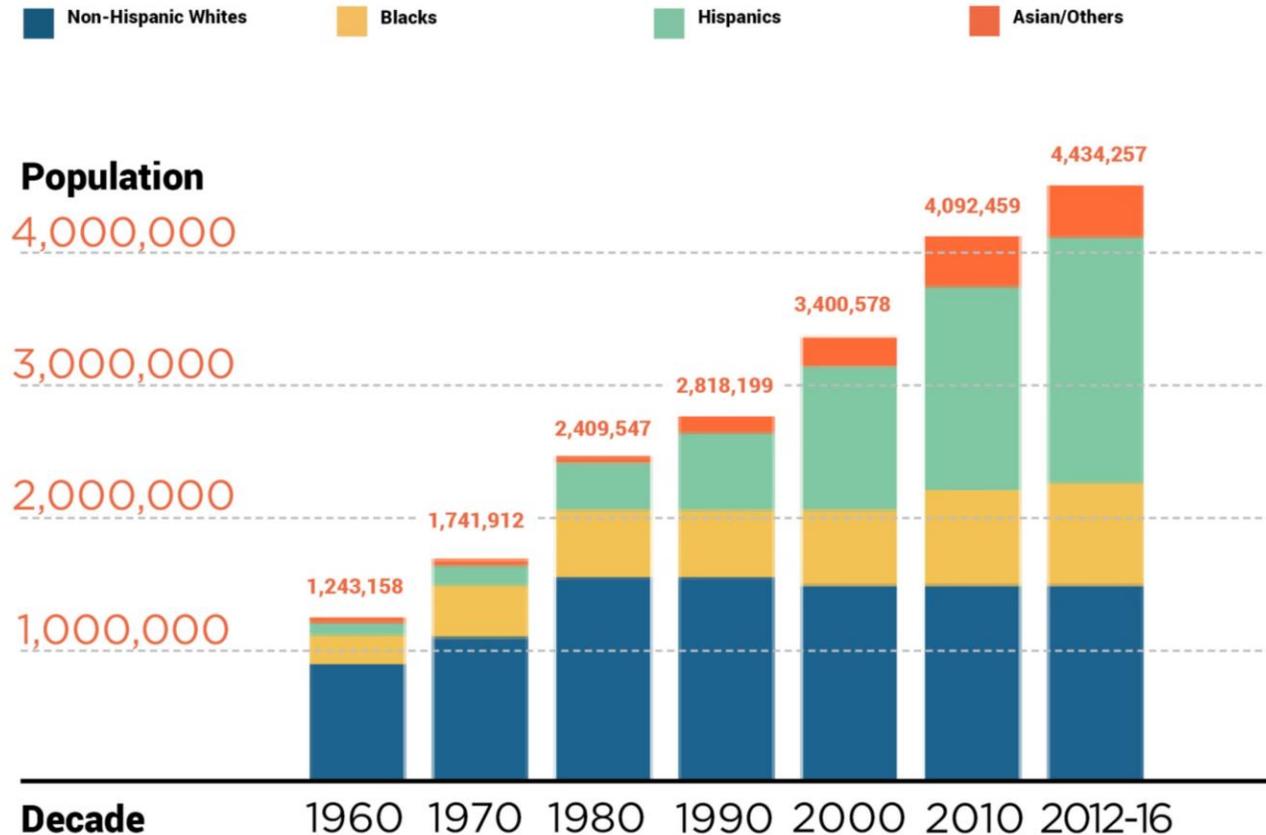


HOUSTON IN CONTEXT NEIGHBORHOOD

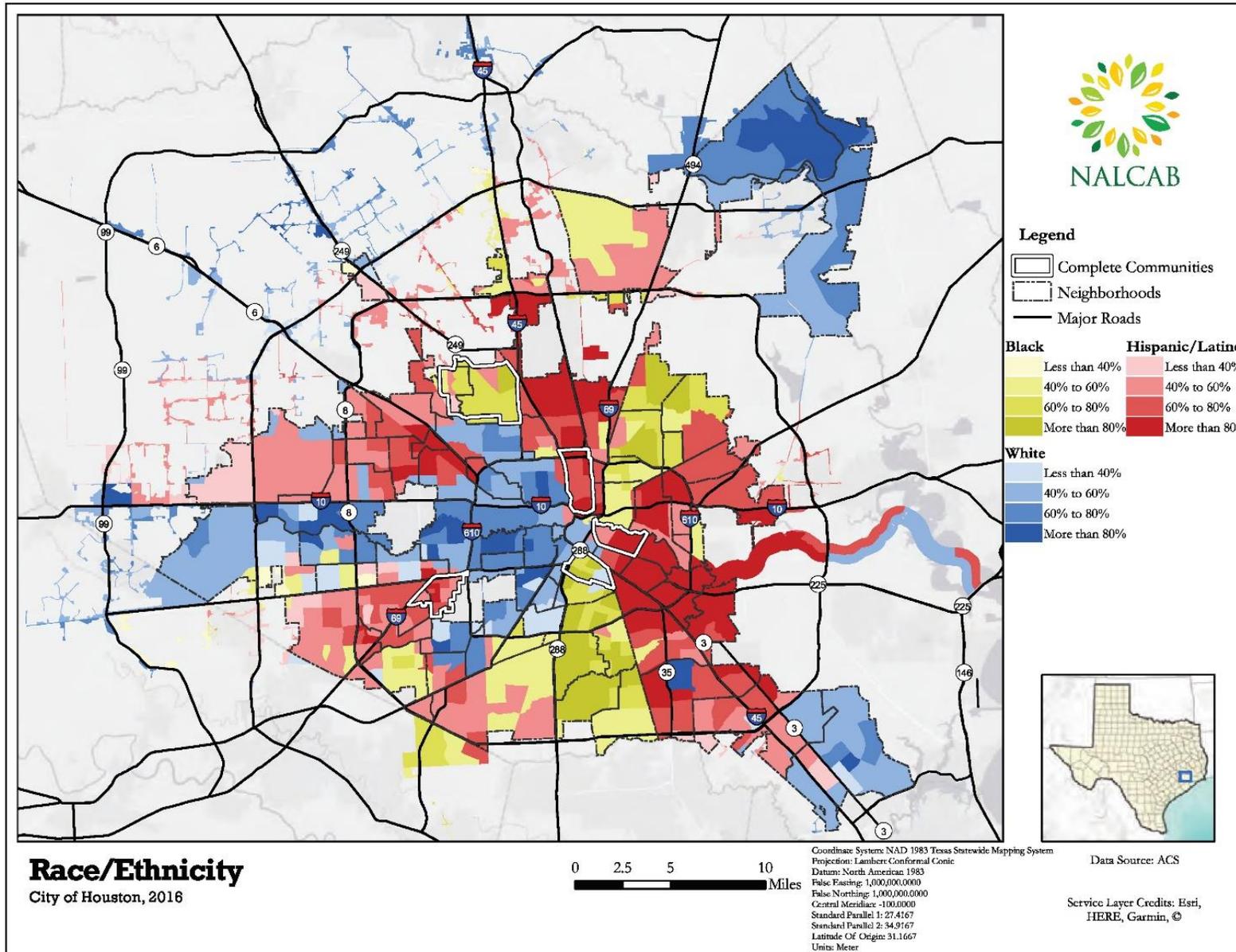
RACIAL DIVERSITY ON THE RISE

Since the 1960's Houstonians have become increasingly diverse with the Hispanic population becoming the majority at 43.8%. Non-Hispanic White population is 25.6%, Black or African American population is 23.7%, Asian population is 6%

Demographics of Harris County by Decade (1960-2010) and ACS Estimates for 2012-2016

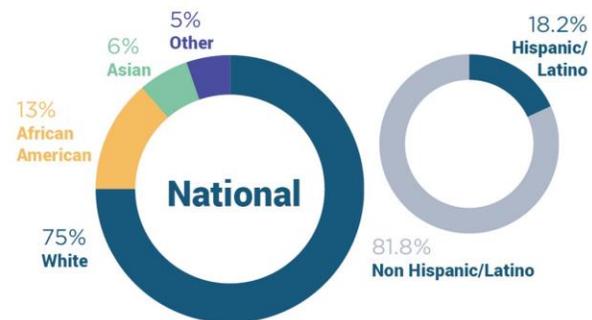
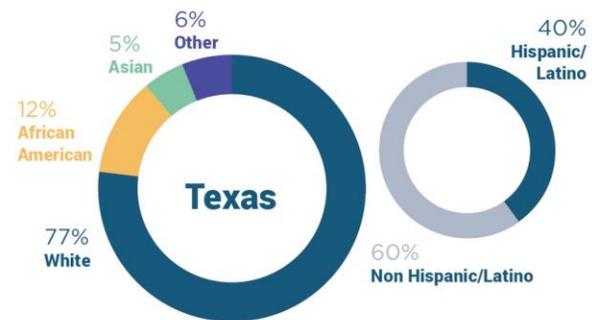


RESIDENTIAL RACIAL SEGREGATION



A MULTICULTURAL METROPOLIS

One in four
Houstonians
were born
outside of the
United States.



145

Languages spoken
in Houston.



More than

one
third

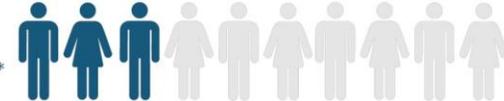
of Houstonians over 5 years old speak a
language other than English at home *

Foreign Born

59%
In the Gulfton
Community



29%
Overall in Houston**



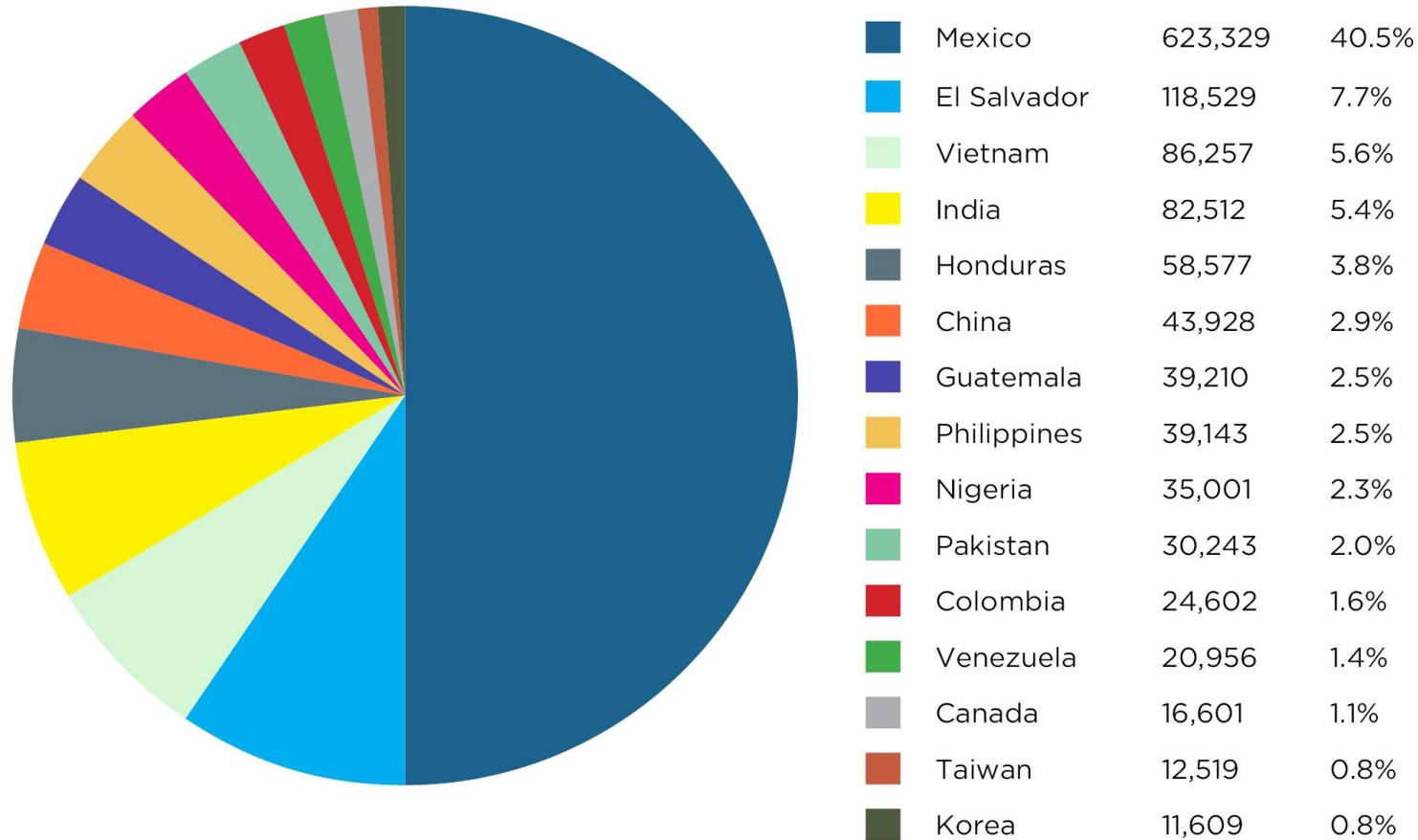
Source: U.S. Census Bureau. Hispanic or Latino Origin by Race. 2013-2017 American Community Survey 5-Year Estimates

*Source: Visit Houston. About Houston, Facts and Figures. Accessed March 20, 2019. <https://www.visithoustontexas.com/about-houston/facts-and-figures/>

** City of Houston. Gulfton, Complete Community Data Snapshot. http://www.houstontx.gov/completemunities/docs_pdfs/Gulfton/Gulfton-DataSnapshot.pdf

COUNTRIES OF ORIGIN

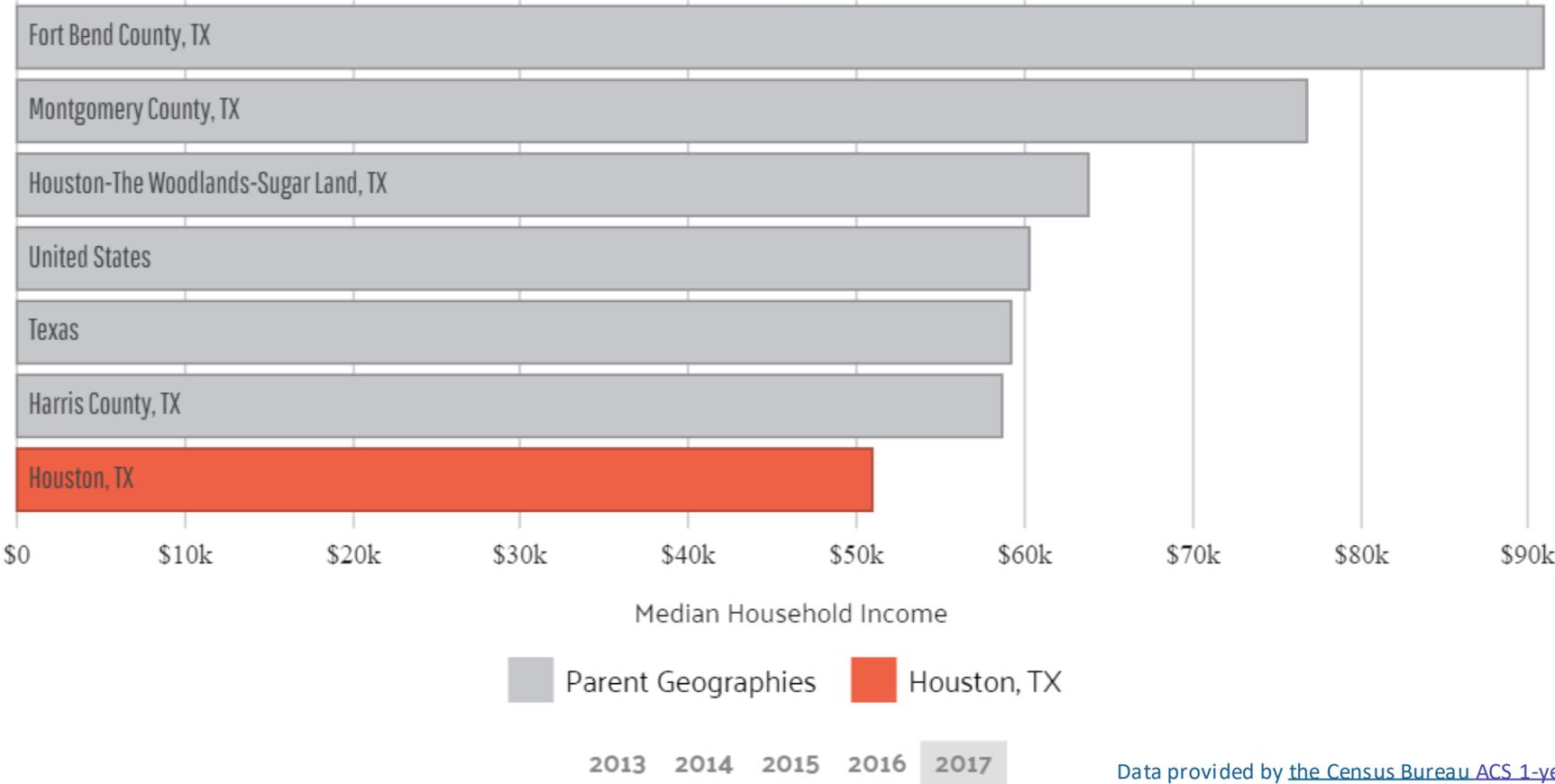
Top 15 Countries of Origin for Houston Area’s Foreign Born Population, and Rank among U.S. Metropolitan Areas, 2013-2017 American Community Survey 5-Year Estimates



Source: U.S. Census Bureau. Top 15 Countries of Origin for Houston Area's Foreign-Born Population. 2013-2017 American Community Survey 5-Year Estimates

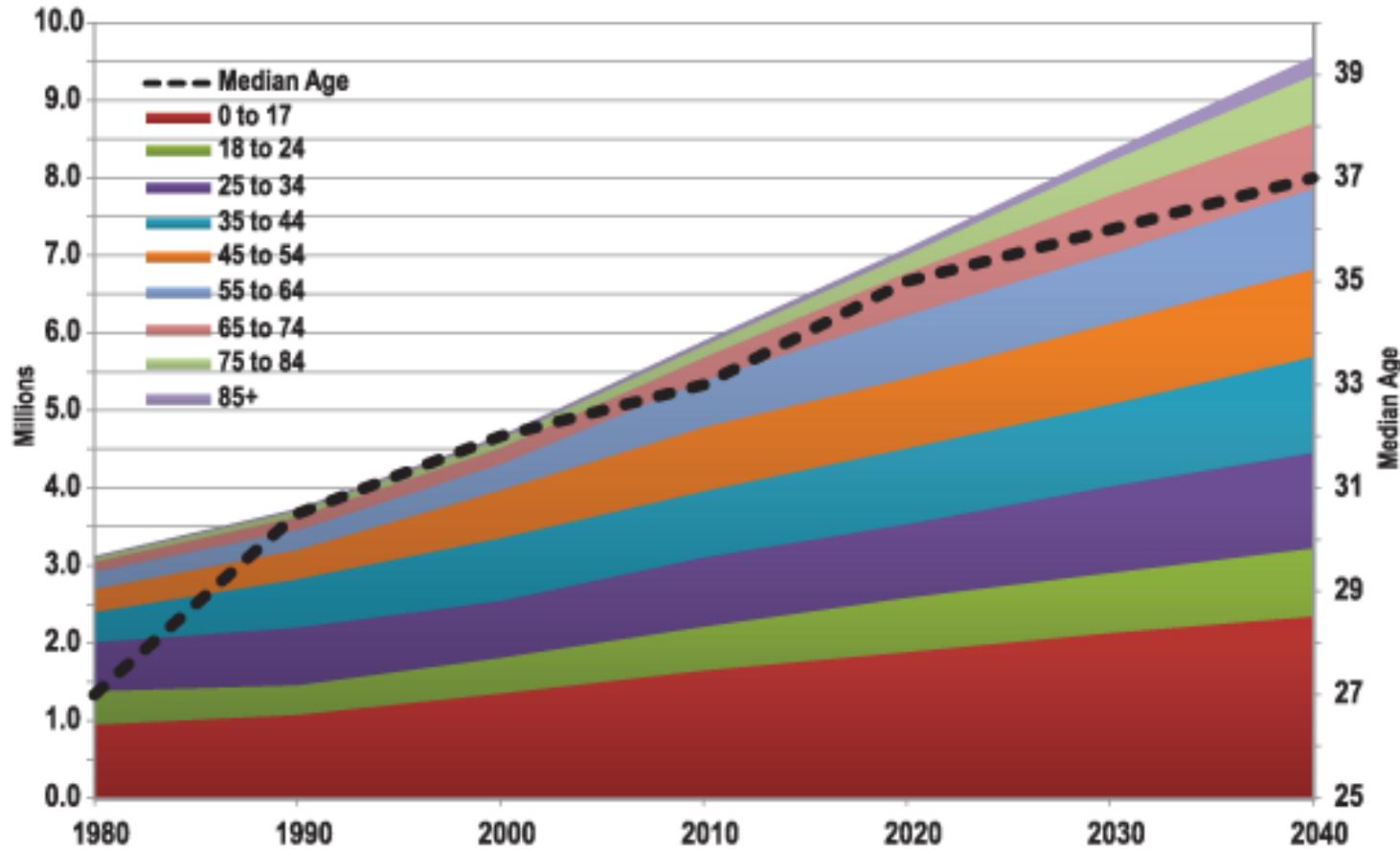
MEDIAN HOUSEHOLD INCOME

Households in Houston have a median annual income of \$50,896, which is less than the median annual income of \$60,336 across the entire United States. This is in comparison to a median income of \$47,793 in 2016, which represents a 6.49% annual growth.



Data provided by [the Census Bureau ACS 1-year Estimate](#)

CHANGING AGE DEMOGRAPHICS



By 2040, the percentage of the population age 60+ will be nearly 10 percent higher than it is today. On the other end of the spectrum, people younger than 20 are expected to make up a smaller portion of the total population than they do today. The implication here is that fewer adult households will have children in schools.

AND SPECIFIC POPULATONS WE SERVE

Over 215,000 Houstonians one or more disability characteristics including:

- 53,000 Houstonians with a **hearing difficulty**
- 46,000 Houstonians with a **vision difficulty**
- 82,000 Houstonians with a **cognitive difficulty**
- 116,000 Houstonians with an **ambulatory difficulty**
- 47,000 Houstonians with a **self-care difficulty**
- 77,000 Houstonians with an **independent living difficulty**



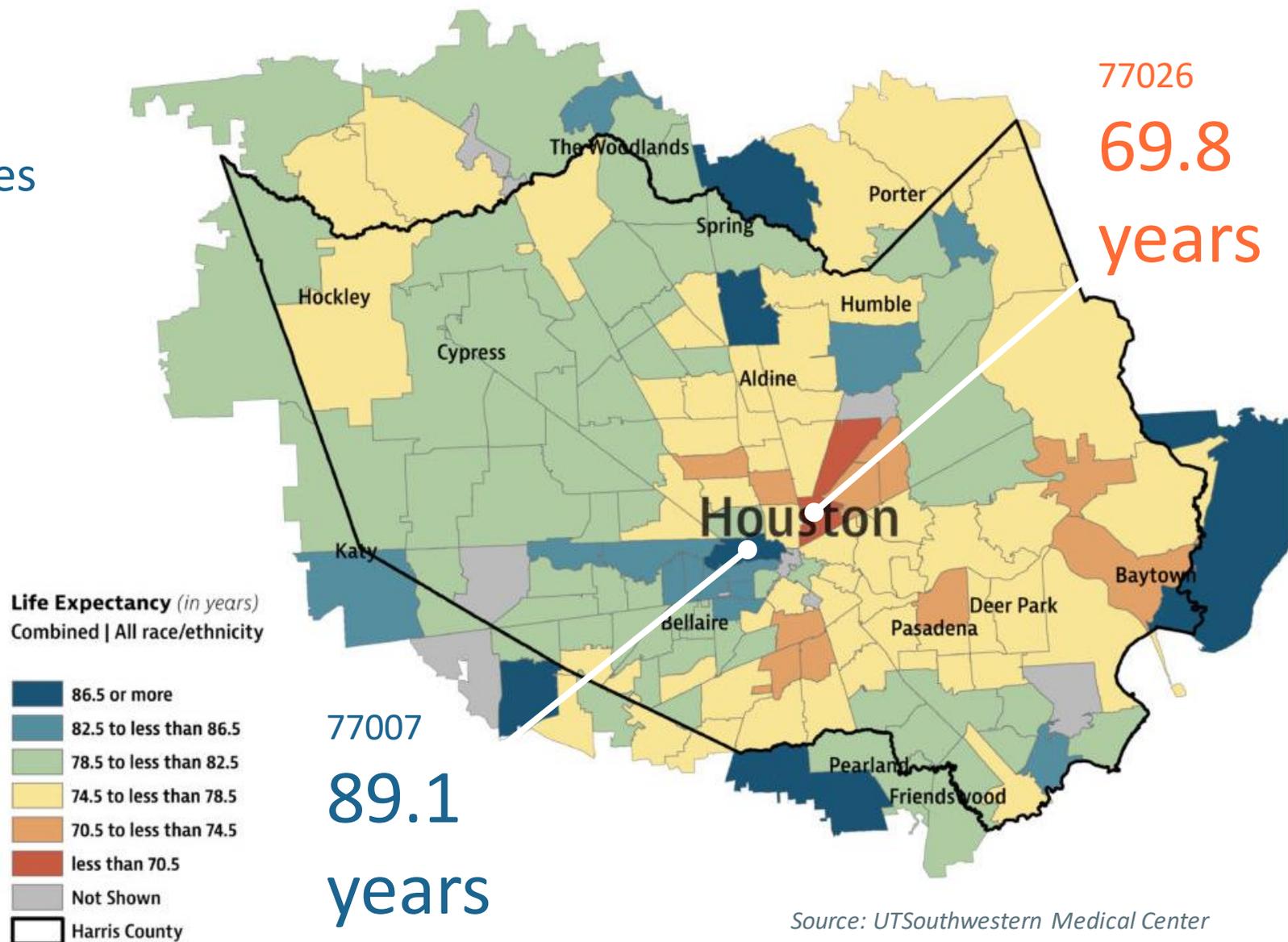
Over 4,000 Houstonians are experiencing **homelessness** according to the 2018 annual Point-In-Time Homeless Count & Survey.



Over 300,000 **Veterans** call the Greater Houston Area home.

DISPARITIES IN QUALITY OF LIFE

Life expectancy varies by as much as **20 years** between zip codes.



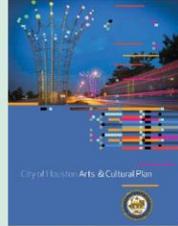
EXISTING AND LINKED EFFORTS & ACTIONS

What is Houston already doing to strengthen the city's resilience?

BUILDING ON EXISTING CITY EFFORTS



My Brother's Keeper (2015-)



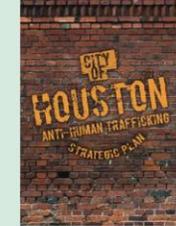
Arts & Cultural Plan (2015)



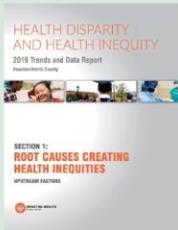
Houston Bike Plan (2014-2017)



Houston Technology and Innovation Task Force Report (2017)



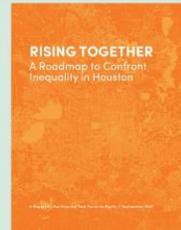
Anti-Human Trafficking Strategic Plan (2017)



Health Disparities and Health Inequity Report (2019)



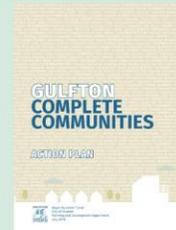
Active Living Plan (2017)



Rising Together: A Roadmap to Confront Inequality (2017)



Welcoming Houston (2017)



Complete Communities (2018-)



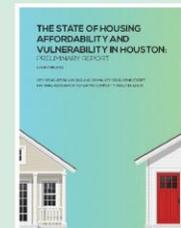
Plan Houston (2015)



ReBuild Houston (2011-)



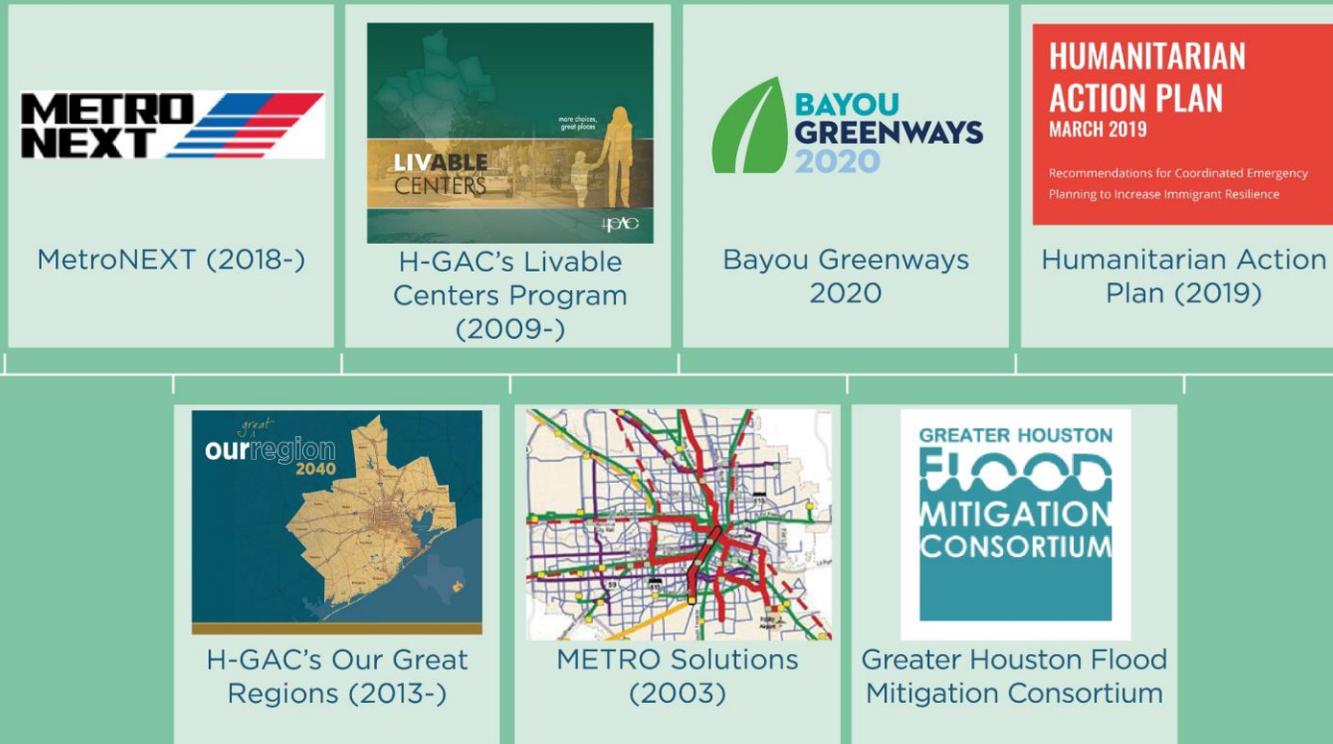
Aging Agenda (2016)



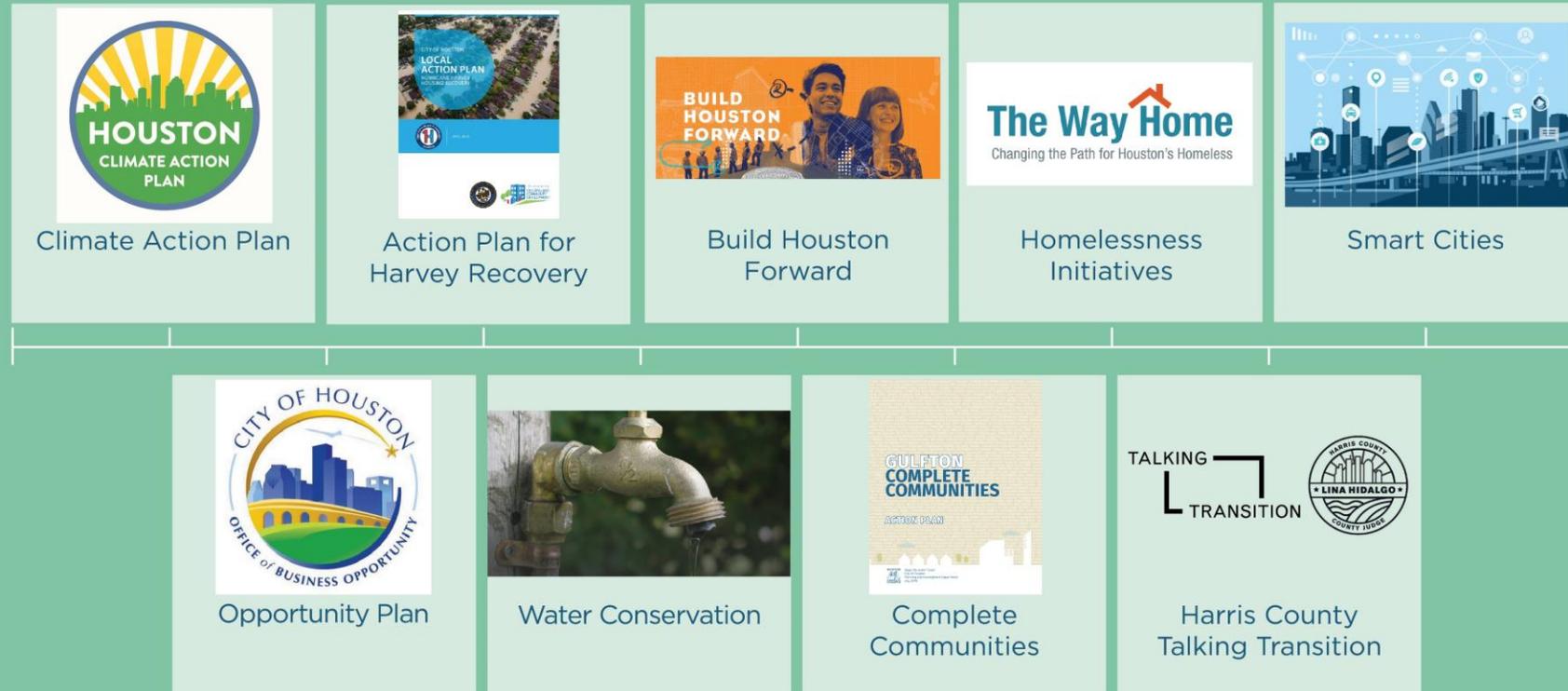
State of Housing Vulnerability (2018-)

BUILDING ON EXISTING PARTNER EFFORTS

EXISTING EFFORTS AND ACTIONS



ALIGNING WITH CONCURRENT EFFORTS



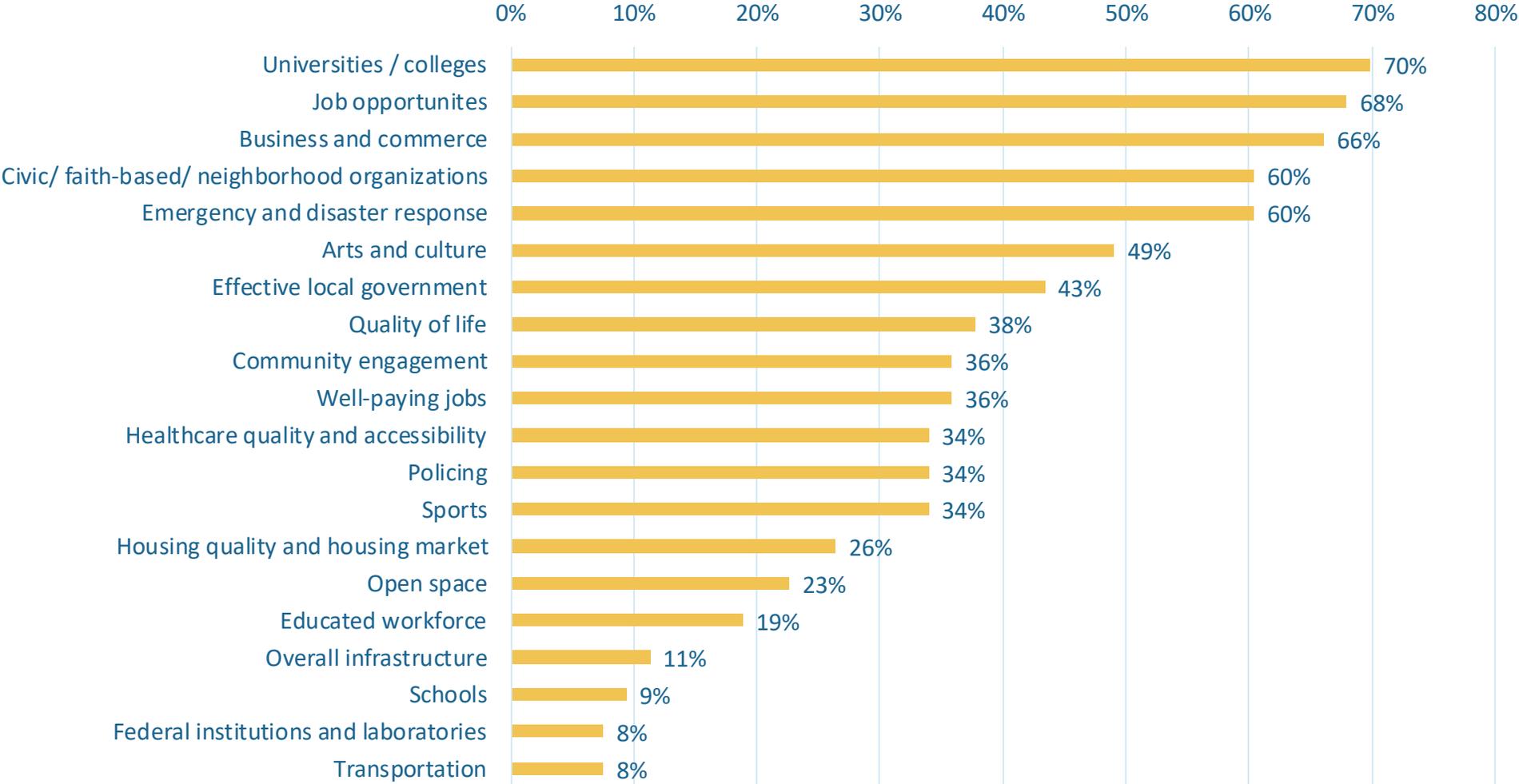
Please contact Chief Resilience Officer Marissa Aho at marissa.aho@houstontx.gov to share additional concurrent efforts.

FALL 2018 AGENDA SETTING WORKSHOP SURVEY



EXISTING EFFORTS AND ACTIONS

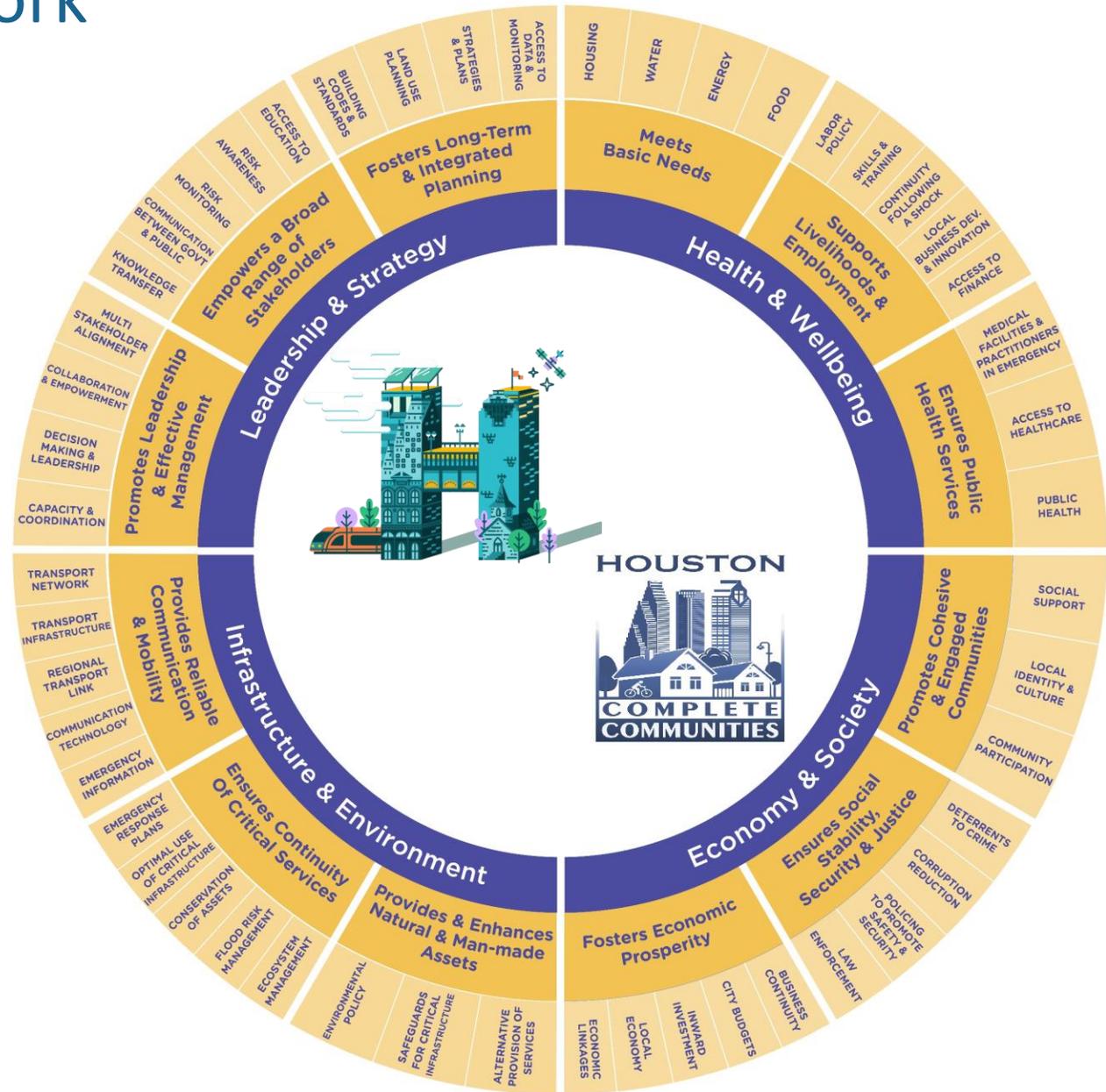
What are the key assets that make Houston resilient today?



City Resilience Framework

Resilient Houston will build upon and integrate numerous existing efforts. As an example of how existing initiatives can be leveraged, the Core Strategies and Performance Indicators of **Plan Houston**, the City's general plan, and the **Complete Communities Action Plans** have been mapped to 100 Resilient Cities' **City Resilience Framework** core quadrants:

- Health & Wellbeing
- Economy & Society
- Infrastructure & Environment
- Leadership & Strategy



HEALTH & WELLBEING: Existing Efforts

CRF Driver: Meets Basic Needs

Relevant Plan Houston Core Strategies:

- Grow responsibly
- Sustain quality infrastructure
- Nurture safe and healthy neighborhoods

Applicable Plan Houston Indicators: 11

Relevant Complete Communities Action Plan Areas:

- Housing

Applicable Complete Communities Projects: 44

CRF Driver: Supports Livelihoods & Employment

Relevant Plan Houston Core Strategy:

- Support a global economy

Applicable Plan Houston Indicators: 18

Relevant Complete Communities Action Plan Areas:

- Economy and Jobs

Applicable Complete Communities Projects: 43

CRF Driver: Ensures Public Health Services

Relevant Plan Houston Core Strategy:

- Nurture safe and healthy neighborhoods

Applicable Plan Houston Indicators: 13

Relevant Complete Communities Action Plan Areas:

- Health

Applicable Complete Communities Projects: 43



ECONOMY & SOCIETY: Existing Efforts

CRF Driver: Promotes Cohesive & Engaged Communities

Relevant Plan Houston Core Strategy:

- Nurture safe and healthy neighborhoods

Applicable Plan Houston Indicators: 26

Relevant Complete Communities Action Plan Areas:

- Civic Engagement
- Neighborhood Character

Applicable Complete Communities Projects: 63

CRF Driver: Ensures Social Stability, Security, & Justice

Relevant Plan Houston Core Strategy:

- Nurture safe and healthy neighborhoods

Applicable Plan Houston Indicators: 15

Relevant Complete Communities Action Plan Areas:

- Civic Engagement
- Safety

Applicable Complete Communities Projects: 71

CRF Driver: Fosters Economic Prosperity

Relevant Plan Houston Core Strategy:

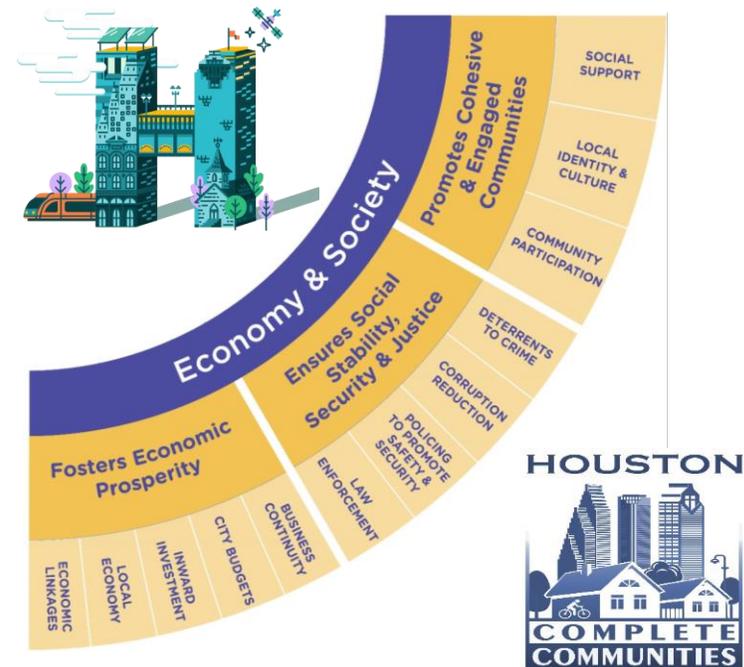
- Support a global economy

Applicable Plan Houston Indicators: 33

Relevant Complete Communities Action Plan Areas:

- Economy and Jobs

Applicable Complete Communities Projects: 43



INFRASTRUCTURE & ENVIRONMENT: Existing Efforts

CRF Driver: Provides & Enhances Natural & Man-made Assets

Relevant Plan Houston Core Strategy:

- Protect and conserve our resources

Applicable Plan Houston Indicators: 9

Relevant Complete Communities Action Plan Areas:

- Parks and Community Amenities
- Mobility and Infrastructure

Applicable Complete Communities Projects: 91

CRF Driver: Ensures Continuity of Critical Services

Relevant Plan Houston Core Strategy:

- Sustain quality infrastructure

Applicable Plan Houston Indicators: 7

Relevant Complete Communities Action Plan Areas:

- Safety
- Parks and Community Amenities

Applicable Complete Communities Projects: 76

CRF Driver: Provides Reliable Communication & Mobility

Relevant Plan Houston Core Strategy:

- Sustain quality infrastructure

Applicable Plan Houston Indicators: 15

Relevant Complete Communities Action Plan Areas:

- Mobility and Infrastructure

Applicable Complete Communities Projects: 59



LEADERSHIP & STRATEGY: Existing Efforts

CRF Driver: Promotes Leadership & Effective Management

Relevant Plan Houston Core Strategies:

- Spend money wisely
- Communicate clearly and with transparency
- Partner with others, public and private

Applicable Plan Houston Indicators: 3

Relevant Complete Communities Action Plan Areas:

- Civic Engagement

Applicable Complete Communities Projects: 27

CRF Driver: Empowers a Broad Range of Stakeholders

Relevant Plan Houston Core Strategies:

- Connect people and places
- Champion learning
- Communicate clearly and with transparency

Applicable Plan Houston Indicators: 16

Relevant Complete Communities Action Plan Areas:

- Civic Engagement
- Education

Applicable Complete Communities Projects: 66

CRF Driver: Fosters Long-Term & Integrated Planning

Relevant Plan Houston Core Strategies:

- Grow responsibly
- Celebrate what's uniquely Houston
- Connect people and places

Applicable Plan Houston Indicators: 19

Relevant Complete Communities Action Plan Areas:

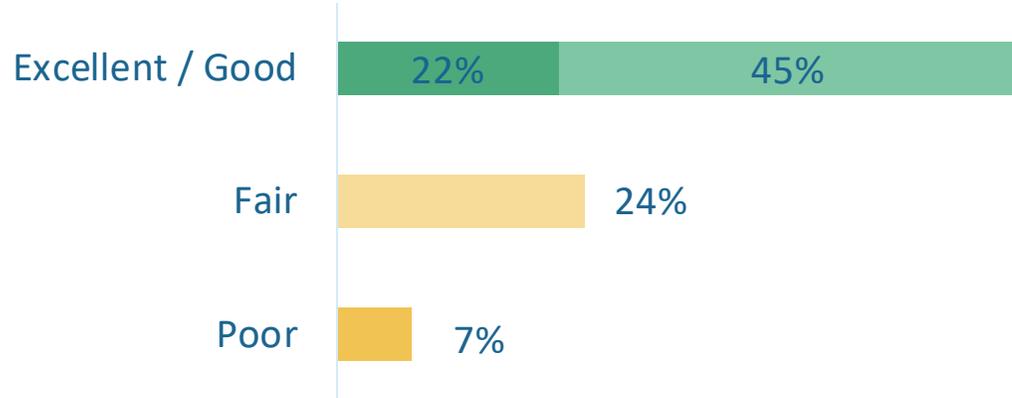
- All

Applicable Complete Communities Projects: 367

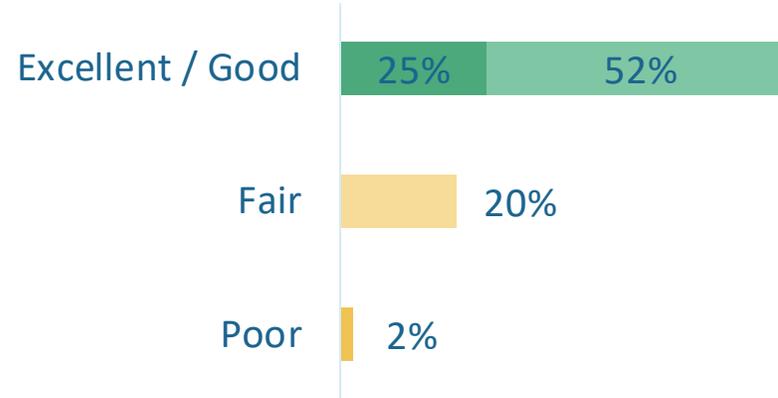


KINDER HOUSTON AREA SURVEY, 2018

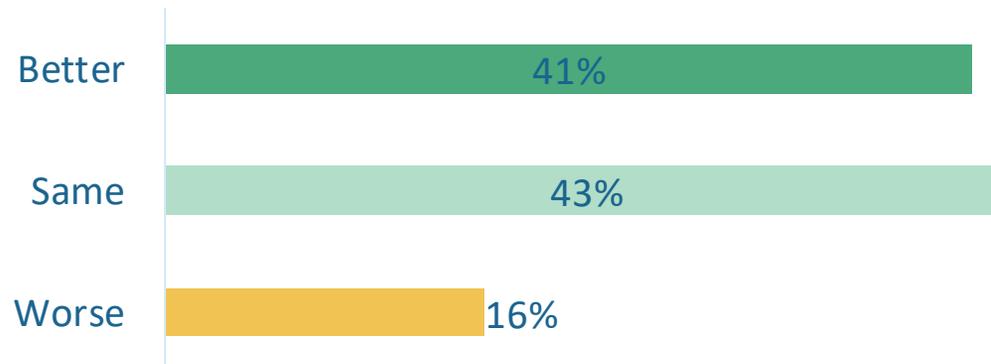
How would you rate job opportunities, in terms of living in the Houston area?



How would you rate the Houston area in general as a place to live?



Quality of living conditions in the Houston area over the past 3 or 4 years are getting:

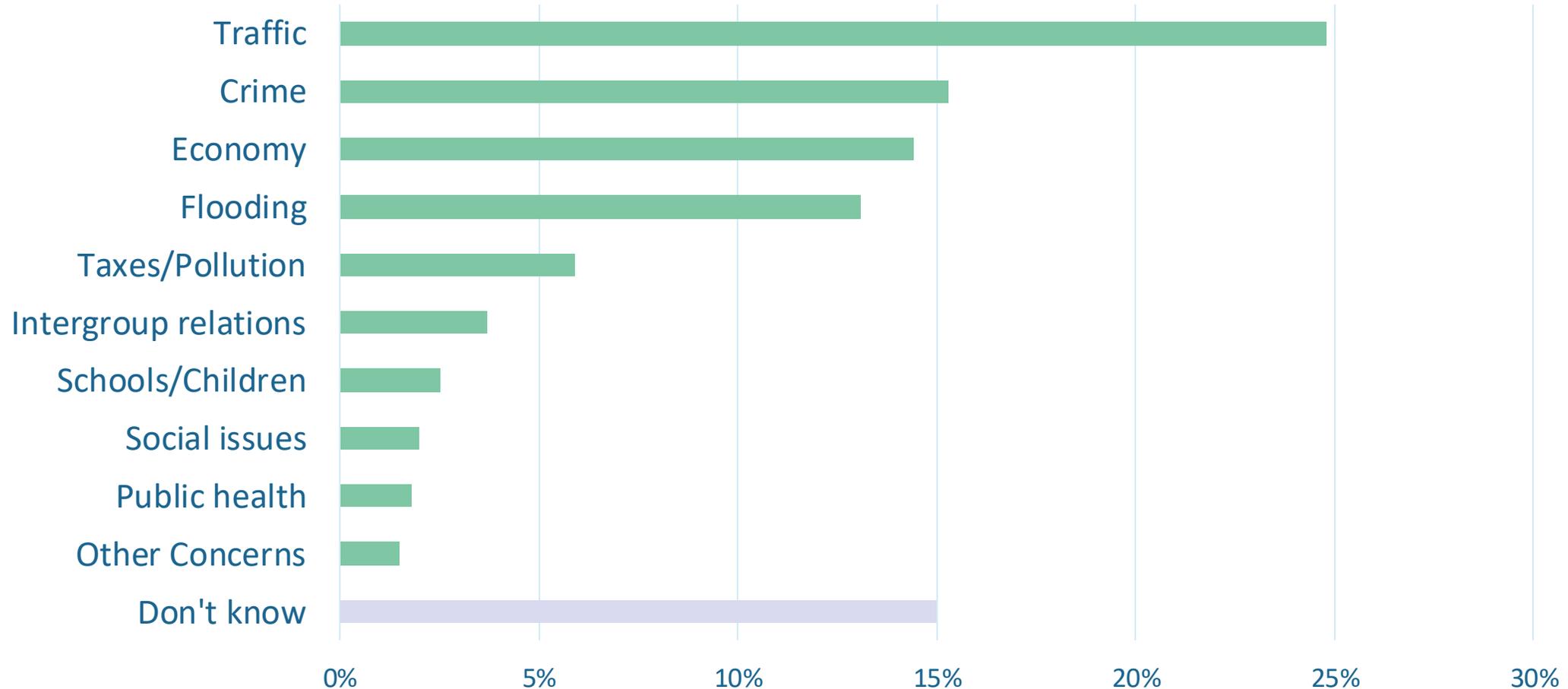


KINDER HOUSTON AREA SURVEY, 2018

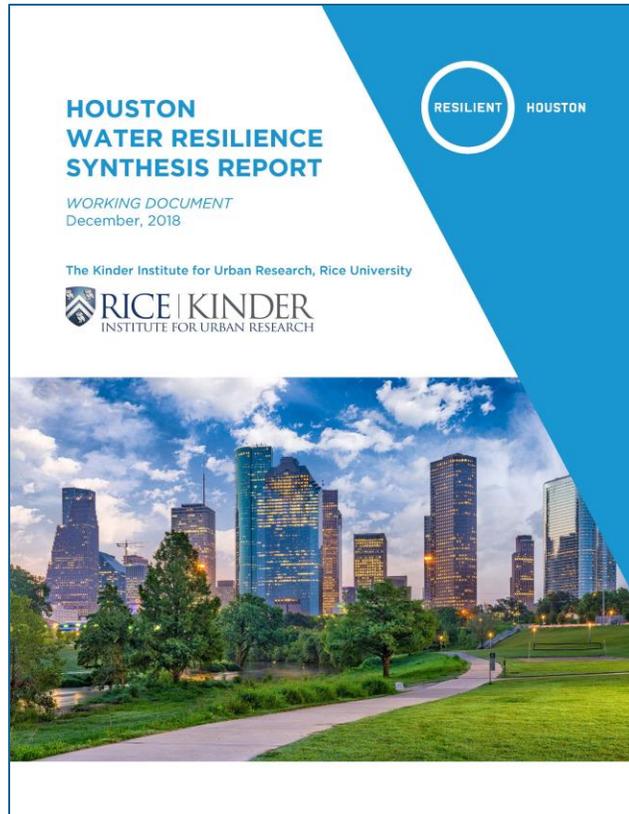


EXISTING EFFORTS AND ACTIONS

What would you say is the biggest problem facing people in the Houston area today?



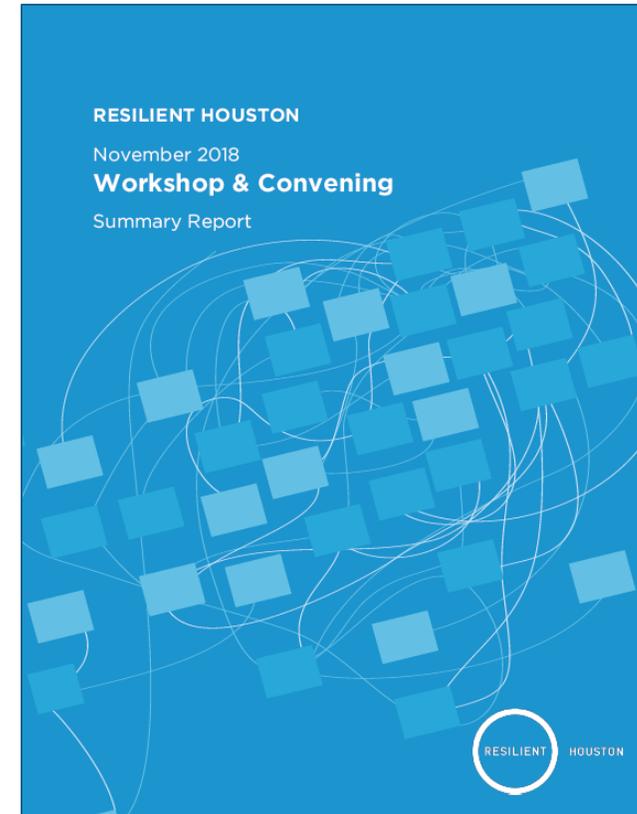
ADDITIONAL RESEARCH ON ONGOING EFFORTS



RESILIENT HOUSTON SUMMARY OF EXISTING EFFORTS

The Resilient Houston process builds on the significant work that the City, its partners, and local stakeholders and residents have already completed to make Houston a more resilient, equitable, vibrant, healthy, and safe place. The below summary of existing efforts reviews the twelve "drivers" of resilience within 100 Resilient Cities' City Resilience Framework. For each driver, the summary identifies relevant strategies and goals within Plan Houston, as well as the results of community-based planning efforts and local surveys on relevant topics. While this short summary cannot list all the significant work that community, public-sector, and private-sector partners are undertaking to enhance resilience, it provides a strong background on community-established values, goals, and ongoing efforts to help inform discussion.

Figure 1. 100 Resilient Cities City Resilience Framework Drivers



SHOCKS & STRESSES

What are our most important threats?

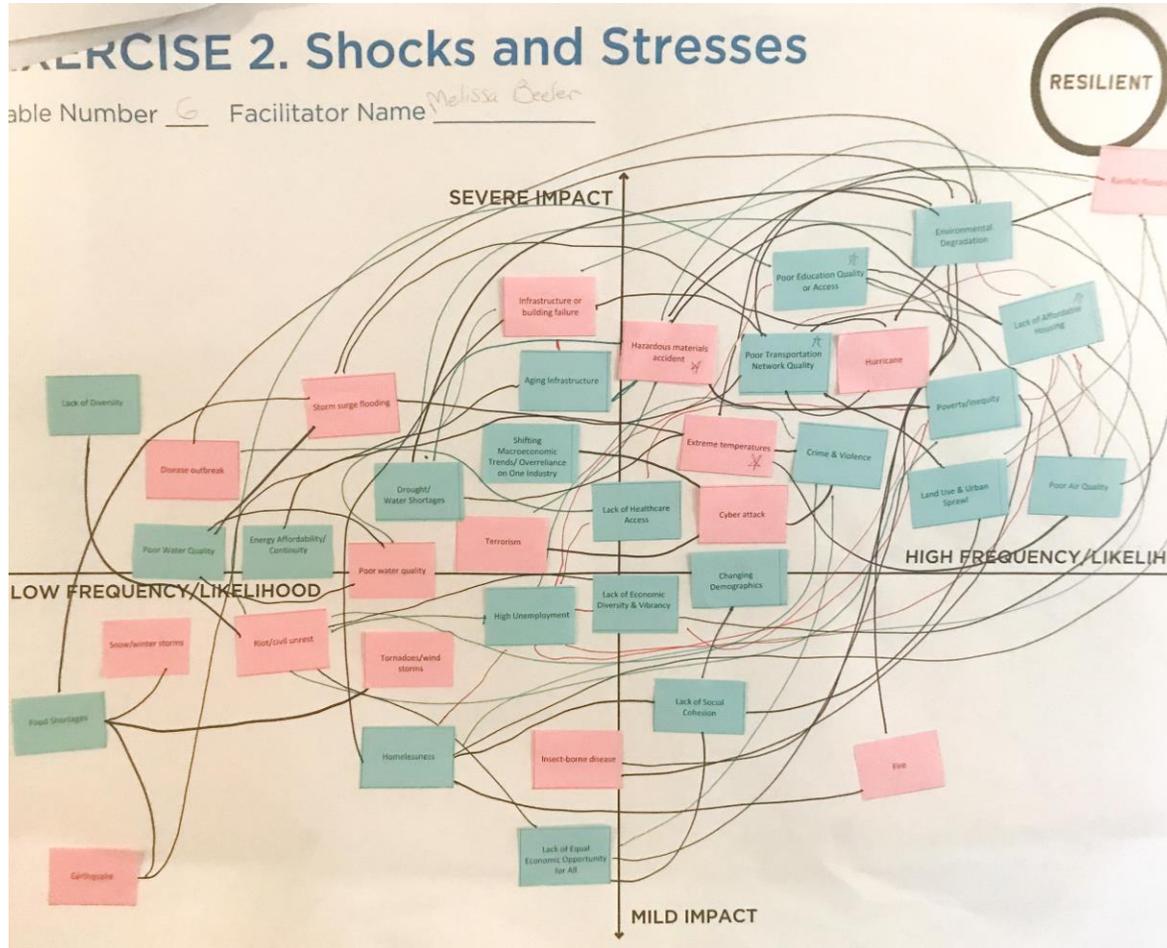
ACUTE SHOCKS FOR HOUSTON

- Flooding
- Hurricane
- Coastal storm
- Extreme heat
- Drought
- High winds/tornado
- Hazardous materials incident – pipeline
- Hazardous materials incident – fixed facility
- Extreme cold
- Wildland fire
- Hail
- Threat involving a high-profile special event
- Lightning
- Hazardous materials incident – highway
- Hazardous materials incident – rail
- Explosive device
- Cyber attack
- Terrorism
- Health emergency*
- Infrastructure failure*
- Economic crisis*
- Oil/gas downturn*

CHRONIC STRESSES FOR HOUSTON

- Poor transportation network quality
- Poor education quality or access
- Lack of affordable housing
- Climate change
- Aging infrastructure
- Energy transition
- Poverty/ inequity
- Land use and urban sprawl
- Poor air quality
- Overreliance on one industry
- Crime and violence
- Lack of health care access
- Homelessness
- Environmental degradation
- Lack of equal economic opportunity for all
- Lack of economic diversity
- Lack of pedestrian safety and accessibility
- Lack of environmental justice
- Displacement
- Slow recovery from Harvey
- Sea level rise/storm surge
- Subsidence
- Population growth

THERE ARE INTERRELATIONSHIPS AMONG SHOCKS AND STRESSES



SOME TOP SHOCKS AND STRESSES IDENTIFIED



Top Shocks

- Rainfall Flooding
- Hurricanes
- Infrastructure Failure
- Hazardous Materials Accidents

Top Stresses

- Lack of Affordable Housing
- Poverty / Inequity
- Education Quality & Access
- Urban Sprawl

PRIORITY SHOCKS AND STRESSES FOR HOUSTON

Equity + Inclusion

- Poor education quality or access
- Poverty/ inequity
- Lack of health care access
- Lack of equal economic opportunity for all
- Linguistic Isolation
- Environmental injustice

Infrastructure + Economy

- Cyber attack
- Infrastructure failure
- Aging infrastructure
- Overreliance on one industry
- Lack of economic diversity
- Slow recovery from Harvey
- Population growth
- Energy transition
- Oil & gas downturn

Health + Safety

- High winds/tornados
- Hazardous materials incidents
- Extreme cold
- Terrorism
- Health emergency
- Poor air quality
- Crime and violence
- Environmental degradation
- Mental/behavioral health

Housing + Mobility

- Poor transportation network quality
- Lack of affordable housing
- Land use and urban sprawl
- Homelessness
- Lack of pedestrian safety and accessibility
- Displacement

Water + Climate

- Flooding
- Hurricanes
- Coastal storms
- Drought
- Extreme heat
- Wildland fire
- Hail & Lightning
- Climate change
- Sea level rise / storm surge
- Subsidence

DISCOVERY AREAS

Where are we focusing our work?

DISCOVERY AREAS FOR PHASE 2

Achieving Equity and Inclusion

How do we overcome disparities and ensure that all Houstonians can succeed?

Building Forward

How do we build back better after disaster – and build new – in ways that will stand up to shocks and stresses?

Improving Health and Safety

How can all Houstonians have the access, information, and opportunity to live safe and healthy lives?

Integrating Housing and Mobility

How can we ensure that development, land use, and transportation patterns serve our needs?

Living With and Without Water

How can we adapt our urban environment to respond to climate change?

ACHIEVING EQUITY & INCLUSION

How do we overcome disparities and ensure that all Houstonians can succeed?

RELATED SHOCKS

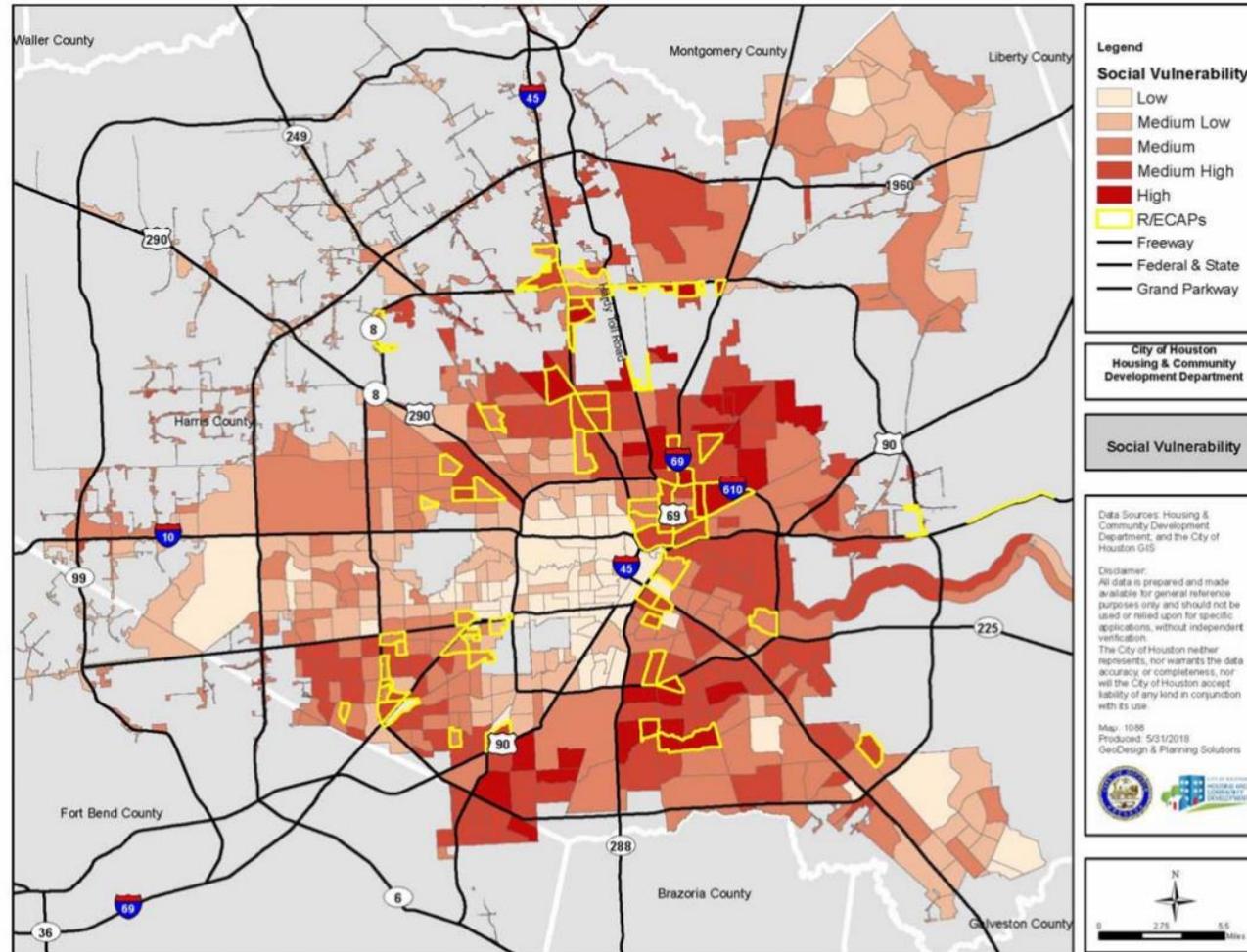
- Hazardous Material & Chemical Emergencies
- Disease
- Extreme Temperatures
- Flooding / Hurricane

RELATED STRESSES

- Poor education quality or access
- Poverty / inequity
- Lack of equal economic opportunity for all
- Lack of health care access
- Linguistic Isolation
- Environmental Injustice

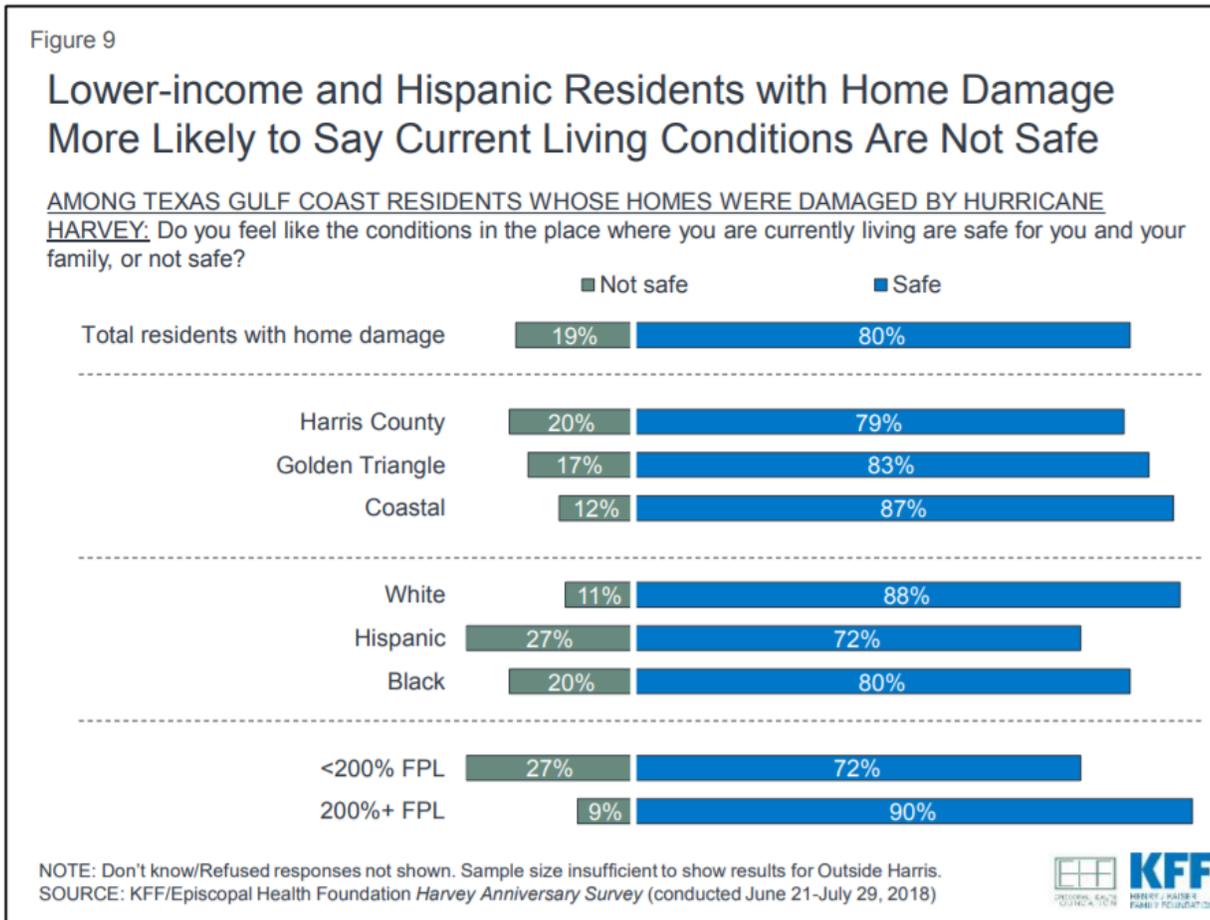
Areas of concentrated social vulnerability need increased resources and attention in order to recover quickly from shocks and stresses.

DISCOVERY AREAS:
Achieving Equity & Inclusion



Source: City of Houston Draft Local Action Plan for Hurricane Harvey Housing Recovery, 2018.

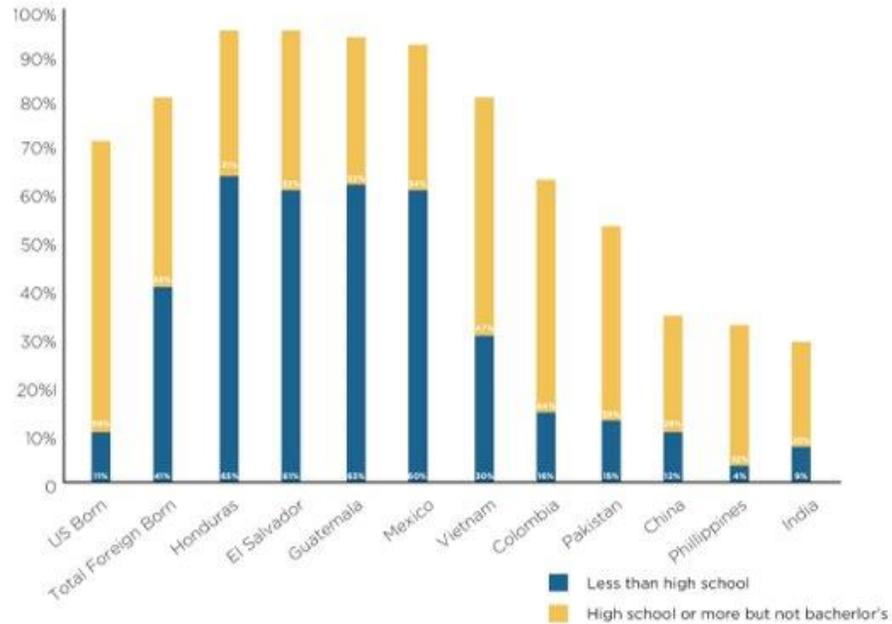
In a survey one year after Hurricane Harvey, Hispanic and black residents of affected areas were most likely to feel that their living conditions remained unsafe.



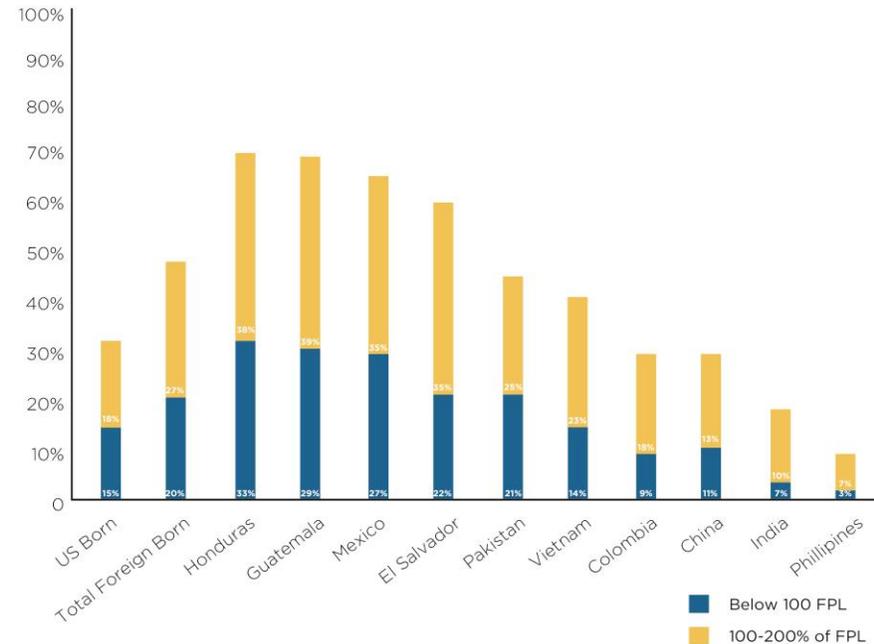
Source: Kaiser Family Foundation/Episcopal Health Foundation *Harvey Anniversary Survey*, 2018

Ongoing inequities can enhance the disparate impacts of disasters and shocks. For example, some of Houston's immigrant populations face particular challenges in attaining higher education and overcoming poverty.

Education Levels of Adults (25 and older) in Houston Area, by National Origin, 2008-12



Poverty Levels for Individuals in Houston Area, by National Origin, 2008-12



Source: Marc R. Rosenblum and Faye Hipsman, *Border Metrics: How to Effectively Measure Border Security and Immigration Control* (Washington, DC: Migration Policy Institute, 2016), www.migrationpolicy.org/research/border-metrics-how-effectively-measure-border-security-and-immigration-control

ACHIEVING EQUITY & INCLUSION

Framing Questions

Region

- How can Houston/Harris County (H/HC) improve voter registration and access to voting?
- How can H/HC better welcome and integrate immigrants and refugees to avoid social isolation?
- How can H/HC institutionalize equity?
 - Making equity an inherent part of decision-making?
 - How can H/HC prioritize/fund capital improvements more equitably?

City

- How can the city improve wages?
- How can Houston align education with future industries/jobs/skills?
- How can Houston improve access to early education?
- How can Houston establish and maintain communication/engagement channels with different populations?
- What tools/platforms are available/appropriate, and can help build transparency and accountability?

ACHIEVING EQUITY & INCLUSION

Framing Questions

Bayou

- What are the barriers to providing equitable access to quality open space amenities?
- How can bayou revitalization institutionalize equitable decision-making processes around land use and environmental justice? (“confront and reverse” patterns of environmental injustice)

Neighborhood

- What are the barriers to equitably connecting neighborhoods to jobs and opportunities?
- How can Houston support the prioritization of neighborhoods historically neglected?
- How can Houston narrow life-expectancy gaps across neighborhoods?

Individual

- What existing resources that support greater equity and inclusion for individuals? What are some of the existing barriers?
- How can Houston improve access to workforce training programs? Provide small business resources?

Across all scales

- How can H/HC and other partners identify and eliminate barriers at each scale to resources (city services; financial resources/tools; healthcare; housing)?

BUILDING FORWARD

How do we build back better after disaster – and build new – in ways that will stand up to shocks and stresses?

DISCOVERY AREAS:
Building Forward

RELATED SHOCKS

- Infrastructure or building failure
- Cyber attack
- Hurricane
- Rainfall flooding
- Storm surge flooding
- Economic crisis
- Oil/gas downturn

RELATED STRESSES

- Aging infrastructure
- Overreliance on one industry
- Lack of equal opportunity for all
- Lack of economic diversity
- Energy affordability / continuity
- Slow recovery from Harvey
- Population growth
- Energy transition

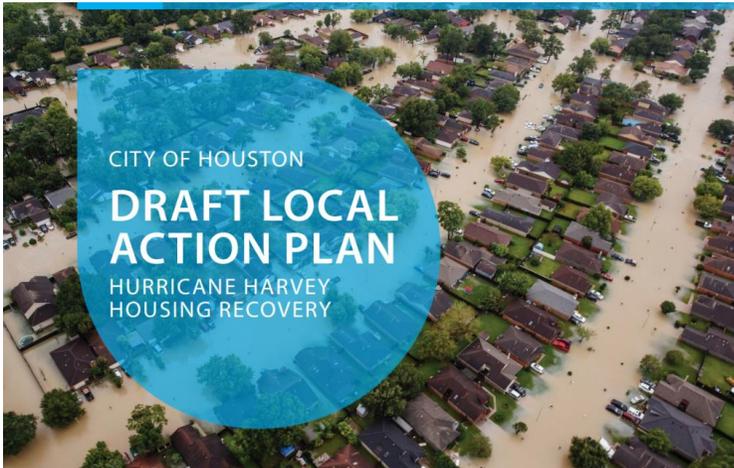
BUILDING FORWARD: EXISTING EFFORTS

The City is concentrating investment in programs that aim to help build neighborhoods, homes, jobs, and infrastructure that will outlast future shocks.



DISCOVERY AREAS:
Building Forward

Housing Recovery



Infrastructure Modernization



Workforce Transition



Economic Diversification

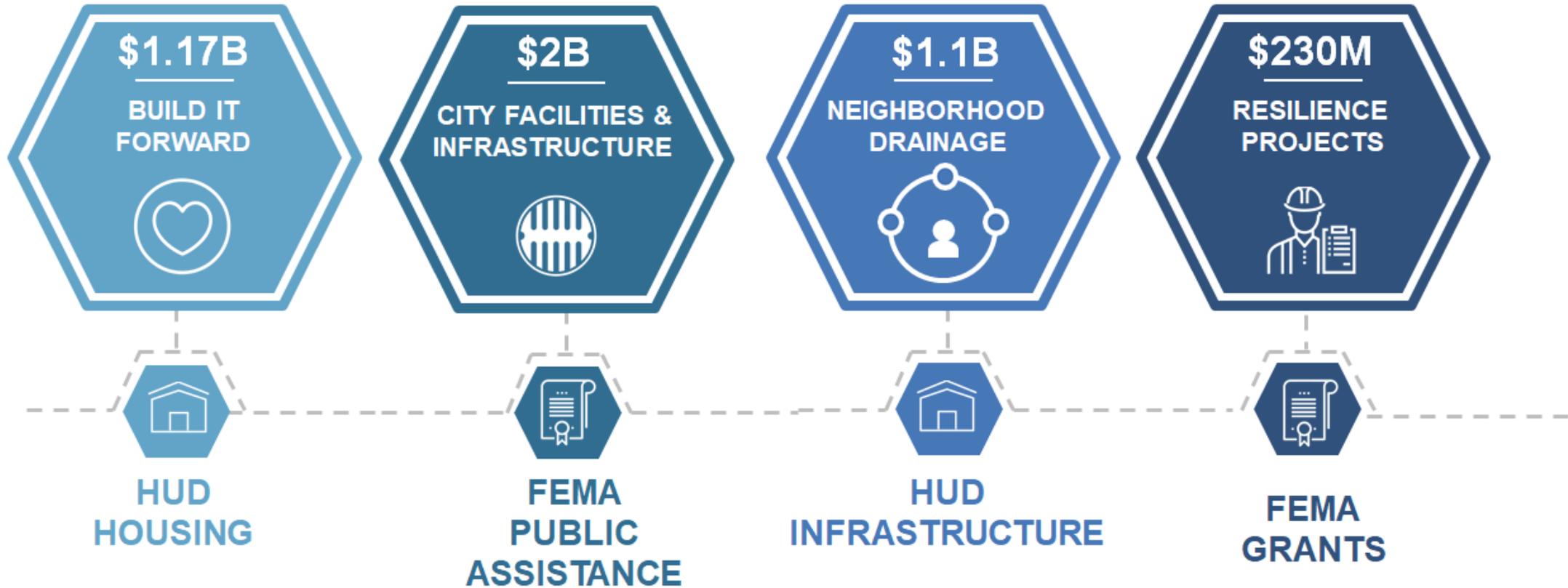


Leveraging Hurricane Harvey Recovery Opportunities

DISCOVERY AREAS:
Building Forward

RECOVERY PROGRAMS

MITIGATION PROGRAMS



Houston's revenue cap constrains the City's ability to invest in important initiatives.

DISCOVERY AREAS:
Building Forward



Currently not funded in budget:



10-15%

Share of recovery costs from Hurricane Harvey



\$152.7m

foregone since 2018 or 1,152 fewer police officers on the street.



\$20M

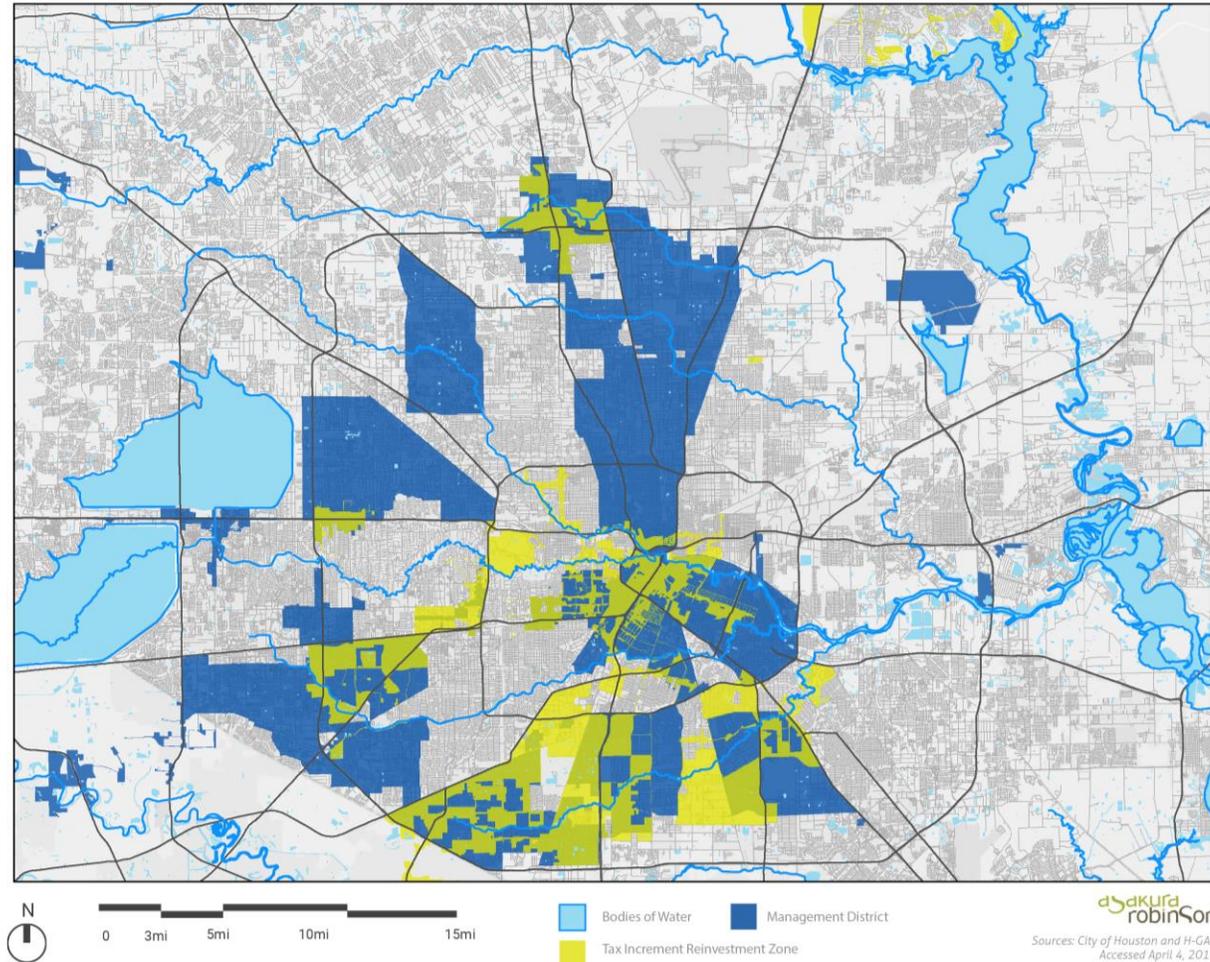
To replenish the Budget Stabilization Fund used for early Harvey-related costs.



\$629M

in deferred building maintenance

The City relies on TIRZs and management districts to make up some of the fiscal gap. While an important resource, these districts are limited in geography and have more investment capacity in wealthier areas.



BUILDING FORWARD

Framing Questions

Region

- How do we ensure infrastructure funding coordination for Houston/Harris County (H/HC) and other local, regional, State and Federal partners?
 - How can equitable investment and maintenance be supported?
- What steps can Houston take to continue economic diversification while keeping the energy/medical "crown"?
- How can equitable distribution of recovery dollars be best supported?

City

- How can the city balance new infrastructure with maintenance, preservation, and retrofit of existing infrastructure?
- What are innovative financial tools and best practices maintenance and not just building new infrastructure?
- What are the best methods for building capacity internally/externally for Houston's growth/changes?
 - I.e. 4th largest US city has no department of transportation
- What "Urban policies" does Houston need for its growth and density and diversity population?
 - Very few traditional "urban procedures and policies" align with geographic/demographic makeup of Houston
- Are there specific misalignments of services that Houston can address to better support the communities' needs?
 - Density isn't where you think it is – service misalignment
- How can Houston prepare for the energy transition and the impact to the local economy?
- How can Houston look at new funding models for government assets (energy efficiency funding)?
- How can the city and its partners advance energy efficiency?

BUILDING FORWARD

Framing Questions

Bayou

- How can Houston “futurize” its “Bayou City” identity as it continues to invest in bayou revitalization/preservation/enhancement?
- How can Houston’s economy be tied to bayou revitalization?

Neighborhood

- How do we tie Harvey Recovery to workforce training, skill building and education?
- How do investments in neighborhoods benefit the neighborhoods/individuals?
- What resources exist or are needed for neighborhoods to build capacity for economic development on a neighborhood scale?
 - e.g. small business support programs

Individual

- How does the workforce/training pipeline get developed/determined?
- What are the barriers to individuals to “Build Forward” (economy, infrastructure), and how can they be removed?
- How can infrastructure investments support equitable economic development? How can un/under-employed individuals participate in recovery and building forward efforts?

IMPROVING HEALTH & SAFETY

How can all Houstonians have the access, information, and opportunity to live safe and healthy lives?

DISCOVERY AREAS:
Improving Health &
Safety

RELATED SHOCKS

- Hazardous Material & Chemical Emergencies
- Disease
- Extreme Temperatures
- Terrorism

RELATED STRESSES

- Poor air quality
- Poverty / inequality
- Lack of healthcare access
- Disparate health outcomes
- Lack of healthy food access
- Crime and violence
- Quality of life
- Mental health and wellbeing

Houston is home to the world's largest medical complex and employs over 350,000 health care workers, yet many Houstonians lack access to affordable health care.

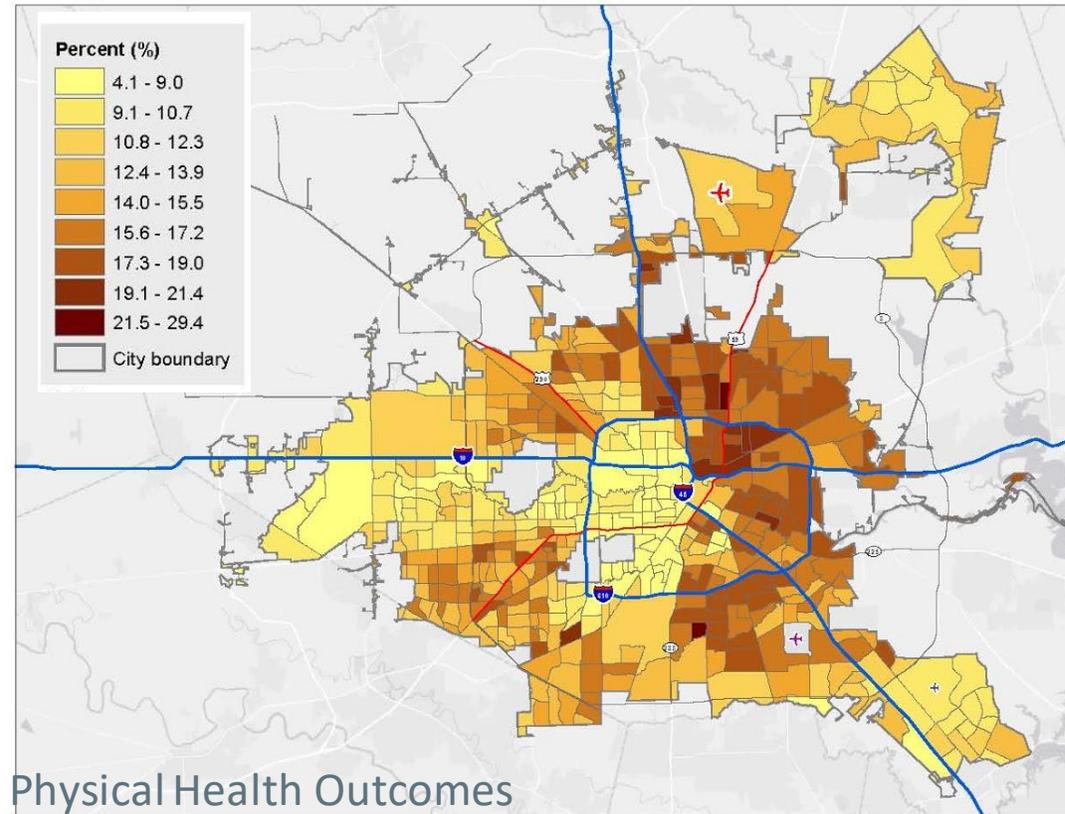
27.4% of adults in Harris County do not have health insurance, compared to 12.3% national average.

43.9% of Hispanic or Latino adults in Harris County do not have health insurance.

There are major disparities in safety and health outcomes among Houston neighborhoods, with communities of color and low income communities experiencing greater health and safety challenges.

DISCOVERY AREAS:
Improving Health & Safety

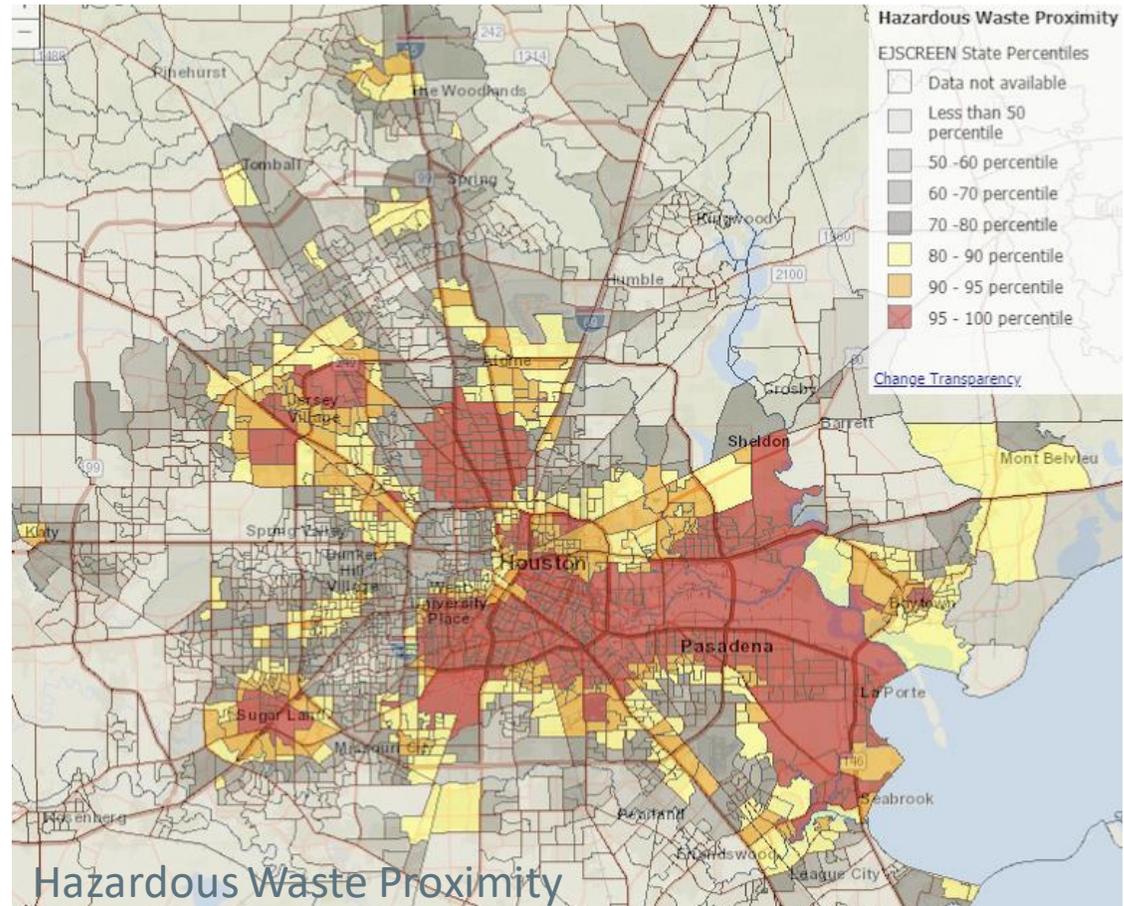
Physical health not good for 14 or more days among adults aged 18 years and by census tract, Houston, TX, 2016



Physical Health Outcomes

Map created by CDC/NCCDPHP/DPH/ESB/OIS

Page 430 of 500 (14/33)



Hazardous Waste Proximity

EPA EJSCREEN

Shocks, like Hurricane Harvey, and ongoing stressors further impact community health and well-being.

DISCOVERY AREAS:
Improving Health &
Safety



Four months after Harvey, **48%** of residents with significant damage to their homes showed signs of serious psychological distress (SPD).

UTHealth School of Public Health

Army National Guard photo by Lt. Zachary West

IMPROVING HEALTH & SAFETY

Framing Questions

Region

- How can Houston/Harris County (H/HC) and other regional partners improve communications of public health safety following chemical emergencies?
- How can H/HC center community health, wellbeing, and environmental justice in policy and decision-making?
- How can H/HC and other regional and State partners improve current and future air quality?

City

- What are quick and visible steps Houston can take to improve quality of life for residents?
- How does Houston communicate health and safety risks/hazards/emergencies?
 - Which modes/channels are effective and why? Which are insufficient/ineffective and why?

Bayou

- How can bayous become health and recreation hubs (“green lungs”)?
 - Ie, improving access/wayfinding/visibility/sense of safety/

IMPROVING HEALTH & SAFETY

Framing Questions

Neighborhood

- What can Houston do to implement Vision Zero strategies on a neighborhood scale, while leveraging opportunities to connect economic development, climate health, and water management at neighborhood intersections?
- How can Houston narrow life-expectancy gaps across neighborhoods?
- How are land use and neighborhoods' physical assets related to health outcomes?

Individual

- How can Houstonians take to improve their health? What are existing tools and resources? What is missing?
- What role do individuals play in advancing better air quality?
 - Where is the disconnect? Lack of available data and resources?
- What resources and gaps exist to providing mental health and community wellness services?

INTEGRATING HOUSING & MOBILITY

How can we shape our regional land use and transportation to better serve our residents?

DISCOVERY AREAS:
Integrating Housing
& Mobility

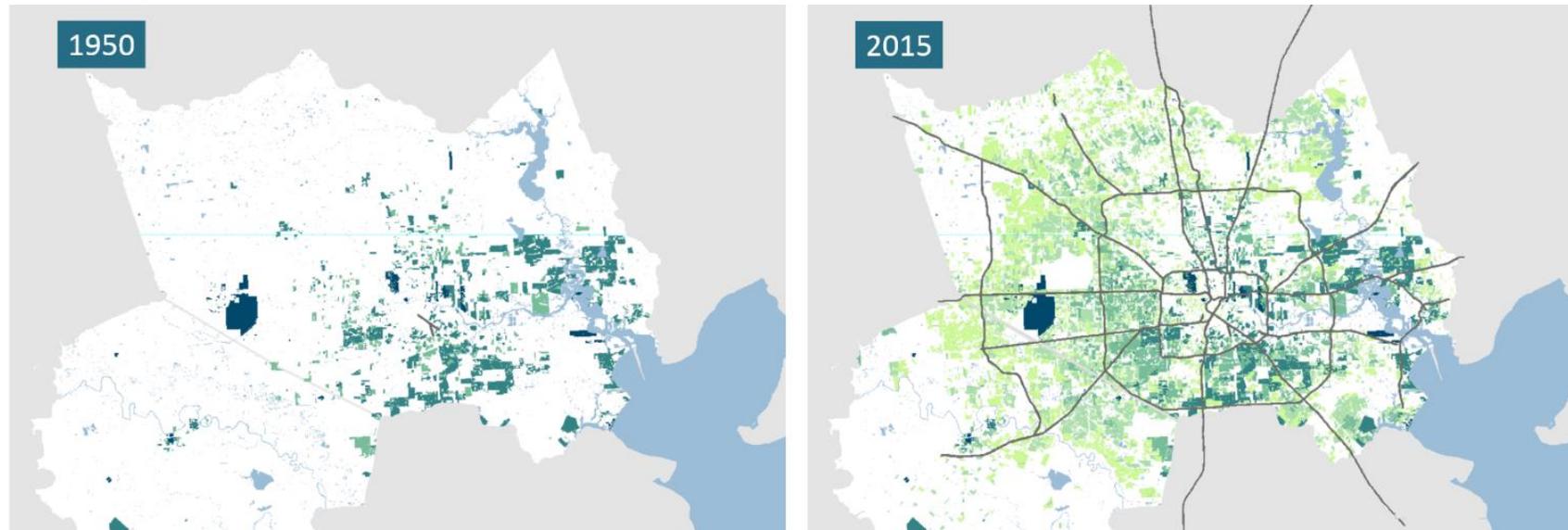
RELATED SHOCKS

- Infrastructure or building failure
- Hurricane
- Flooding

RELATED STRESSES

- Poor transportation quality
- Lack of affordable housing
- Aging infrastructure
- Poverty / inequity
- Land use and urban sprawl
- Homelessness

Houston's growth has been exponential. While this growth has many benefits, it has largely relied on expanding road systems to serve an increasingly sprawling region.



Subdivision plat maps in Harris and Fort Bend counties. The county boundaries didn't change since 1839. Note that there are gaps in the built-up areas. Some areas were developed before there were subdivision plats formally recorded with the county, such as neighborhoods in Montrose, Downtown Houston, and some of the historic neighborhoods such as East End and Third Ward. Some places are considered as commercial development or industrial areas, but not a plat, such as shopping centers, schools, parks and airports.



Subdivision Plat File Year

Source: Wittenberg, Gordon, Amanda Chang, and Kinder Institute For Urban Research. "Subdivision Plats Data in the Houston Area." 2018. Web

This sprawling growth presents challenges for the City and region – such as over-reliance on municipal utility districts to fund infrastructure, which often do not have adequate resources to fund ongoing maintenance and upkeep.

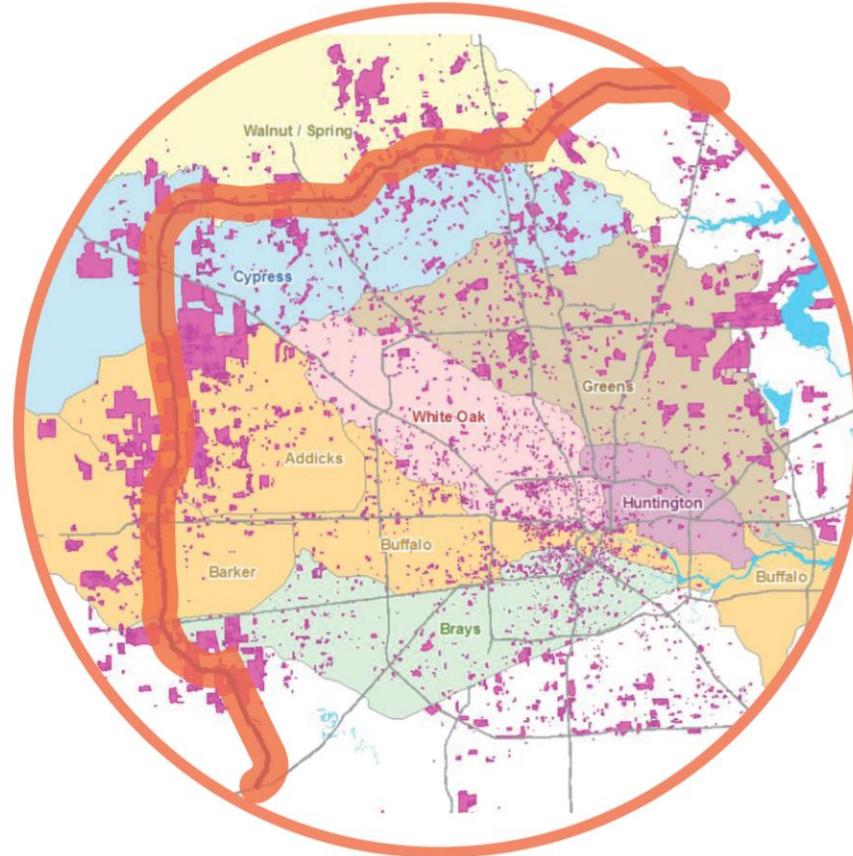
DISCOVERY AREAS:
Integrating Housing
& Mobility

50,000
acres

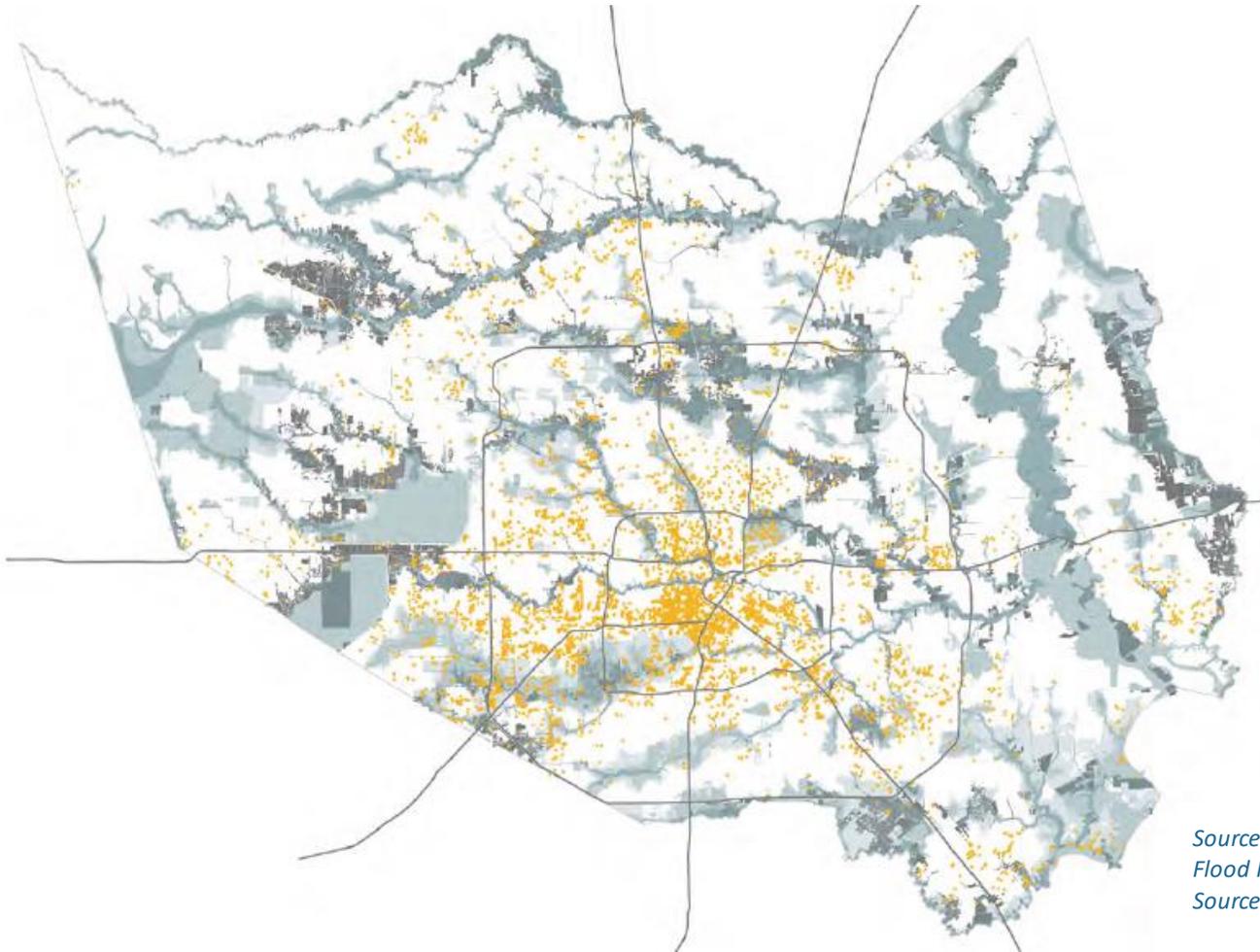
platted within

3 miles

of the Grand
Parkway from
2013-2018
by Watershed



Housing and transportation are the two largest expenses for households across the country – planning ahead to manage these expenses will help ensure an inclusive and prosperous Houston.



57%

of City of Houston households rent

45%

of the renter households in Houston
spend more than 30% of their incomes
on housing

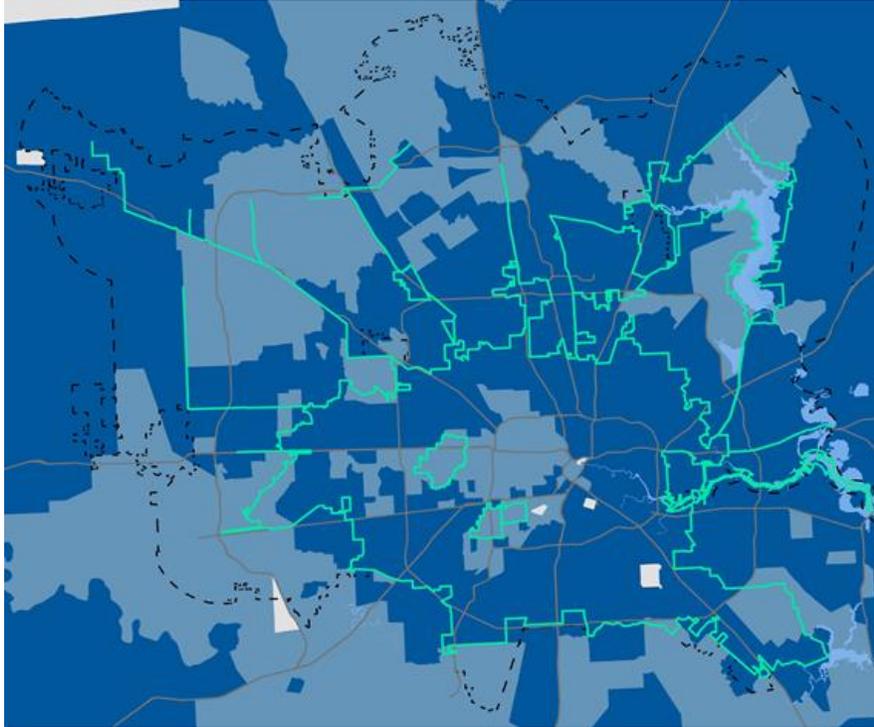
5,874 or 26%

multi-family units are directly in
the floodway in the City of
Houston

Source: *Affordable Multi-Family Housing: Risks and Opportunities*. Greater Houston Flood Mitigation Consortium. March 2019.

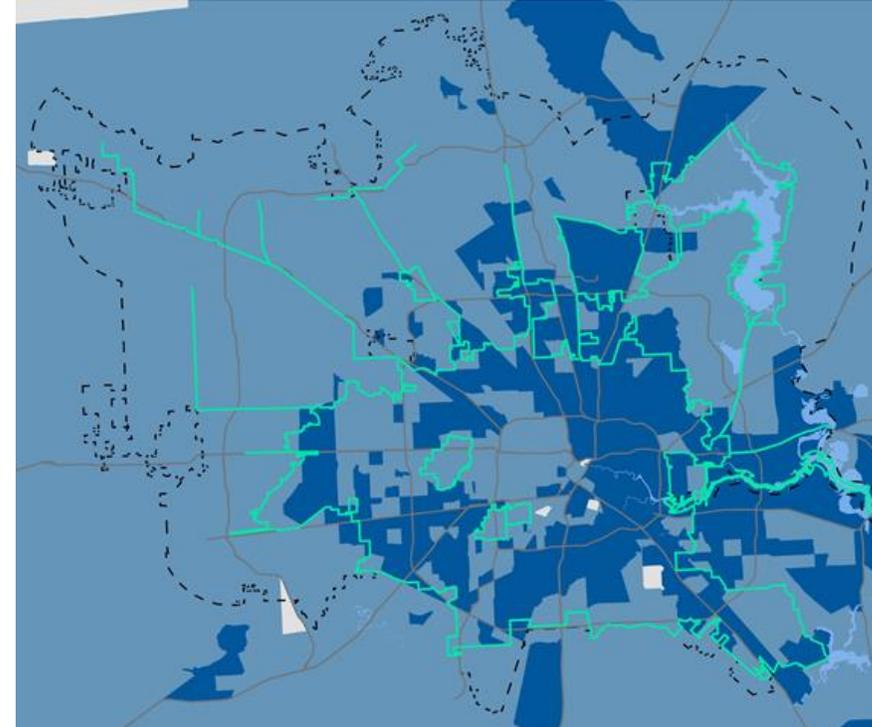
Source: HUD 2006-2015 Comprehensive Housing Affordability Strategy

Regional Affordability: Housing + Transportation



Housing is less than 30% of income 
Housing is more than 30% of income 

When using the standard metric that suggests housing costs not exceed 30% of income, much of the Houston area is affordable to local residents.



Housing + Transportation is less than 45% of income 
Housing + Transportation is more than 45% of income 

When using the standard metric that suggests housing + transportation costs not exceed 45% of income, much of the Houston area is unaffordable to residents.

INTEGRATING HOUSING & MOBILITY

Framing Questions

Region

- How do jobs/entertainment/choices/opportunities/impact housing and mobility choices/opportunities?
- How does Houston want to grow? What is the growth model that the region wants/needs for the future?
- What is the relationship between transportation investment, affordable housing, unemployment, and jobs?
- How will future demographics/growth projections impact housing and mobility?
 - How can the region be proactive in planning for these changes?
- How is mobility choice tied to density?

City

- What is the growth model that we want for the future?
 - What is the City's role in this conversation?
 - How can housing and mobility decisions impact that future?
 - What types of incentives/partnerships could the City put in place to accelerate implementation of this vision?
- What are barriers to more housing/mobility choice?
 - e.g. parking requirements – how can parking requirements be used as a tool to implement Houston's growth vision?

INTEGRATING HOUSING & MOBILITY

Framing Questions

Bayou

- What is the desired relationship for housing and mobility adjacent to the 22 bayous (safety, connectivity, recreationally)?
- What is the vision for a more walkable/bikeable Houston? How can bayous and neighborhoods lead?
 - What do first/last mile solutions look like for Houston?

Neighborhood

- How do City policies impact affordability for all neighborhoods?
- What is a good model for housing “8-80” in a neighborhood to provide housing choice for all stages of life?
- How do you prioritize safe and accessible transportation/mobility investments?
- What is the true household cost of housing & mobility in Houston?
 - How can addressing this relationship increase affordability?

• Individual

- How do we maintain housing affordability and access to cost effective and equitable transportation?
- What are the existing resources for individuals to improve their housing and mobility choices?

LIVING WITH & WITHOUT WATER

How can we adapt our urban environment to respond to climate change?

RELATED SHOCKS

- Rainfall flooding
- Hurricane
- Storm surge
- Extreme temperatures

RELATED STRESSES

- Land use and urban sprawl
- Environmental degradation
- Drought / water shortages
- Poor water quality

Houston's relationship to water has shaped the city's history, commerce, and growth - but it also underlies many of the city's major past shocks and stresses and future resilience challenges.

Adapting to a changing environment requires a comprehensive approach to living with water across multiple scales.

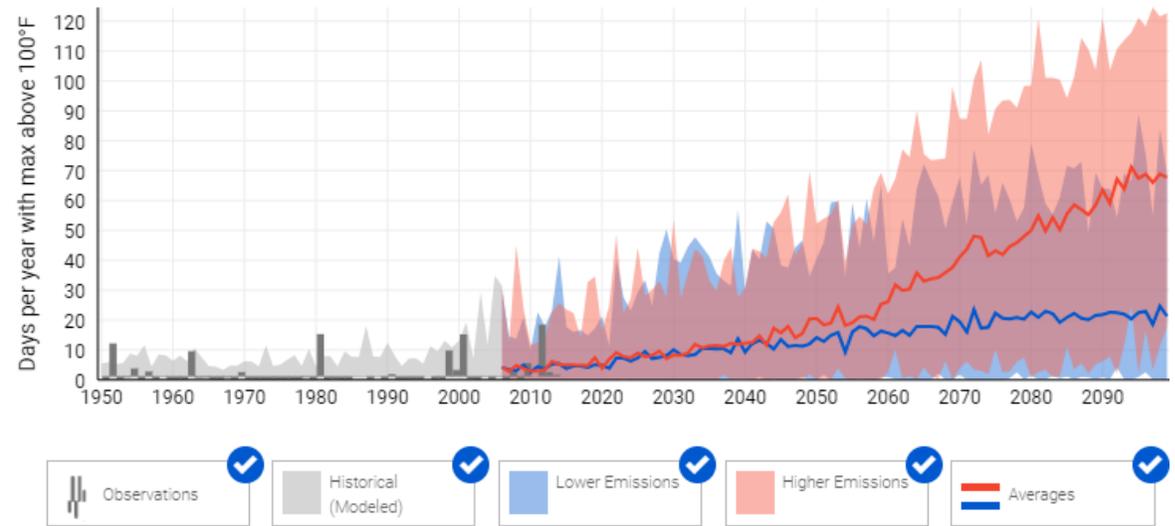


Greater prevalence of extreme heat and drought events will also require Houston to adapt.



Temperatures reached 100°F+ daily from August 1-24, 2011. A survey found that over 1/3 of Houstonians could not keep their houses cool enough, citing unaffordable electricity bills or a lack of air conditioners.

Houston could experience 70 days per year with max temperatures above 100°F by 2100.

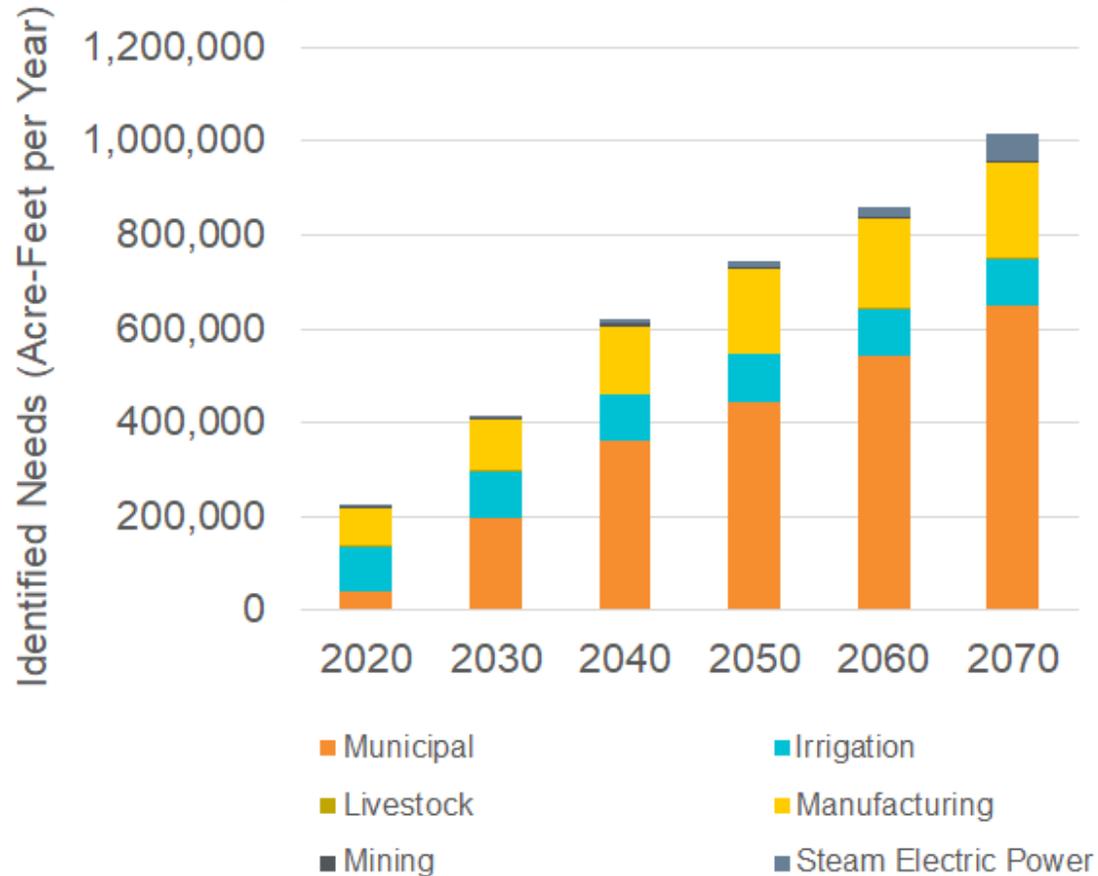


Source: US Climate Resilience Toolkit

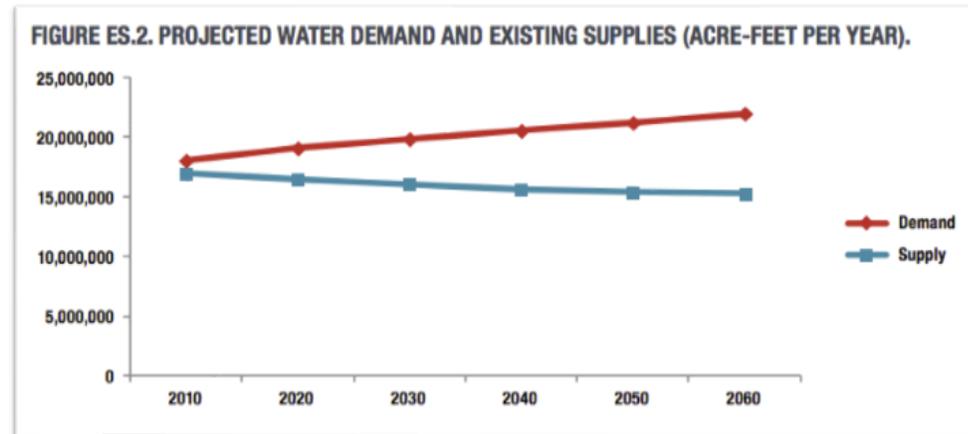
How will growing water needs for the region and projected decreases in supply accelerate existing conservation efforts?

DISCOVERY AREAS:
Living With &
Without Water

Regional water needs are projected to grow by five times from 2020 to 2070.

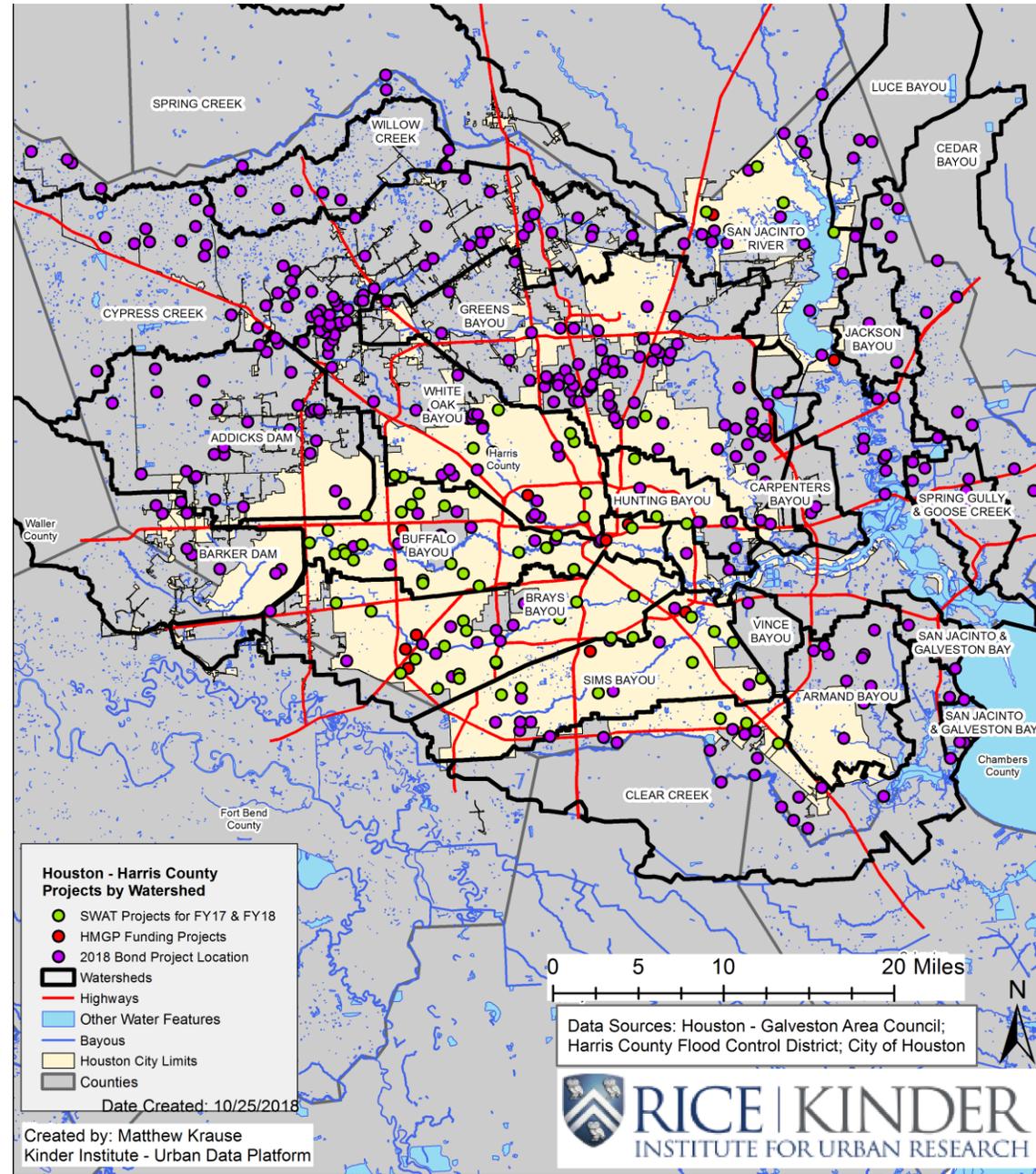


Projected water supply and demand information for the State of Texas indicates that the gap is widening between existing and water resources and projected demand.



There are several major initiatives underway – including \$2.5B in Harris County Bond Projects and the Bayou Greenways 2020 and Beyond the Bayous initiatives and the City's Water Conservation Plan - that have the potential to significantly shape the way the Greater Houston region lives with its water and adapts to climate impacts.

Proposed Harris County Bond Projects, Active City of Houston Stormwater Action Team Projects, and City of Houston HMGP Requests



LIVING WITH AND WITHOUT WATER

Framing Questions

Region

- How can flood mitigation projects be better coordinated across agencies and jurisdictions, including not just flood management agencies but also school districts, housing authorities, and economic development groups that can play an important role?
- What are opportunities and roadblocks to consistent regulations and standards across jurisdictions?
- What is a regional vision for water management from “Prairie to Bay”? How can the region consider positive and negative upstream and downstream (full watershed) impacts?
- How can we better translate science to action by creating tactical plans and projects for climate adaptation and water resilience?

City

- What are the critical data and resources needed to develop a comprehensive long range plan for flooding and climate adaptation? What climate risk projections and data exist, what are the gaps, and what should climate targets be?
- How do we plan based on future projections and uncertainty and not the past?
- What are the opportunities and barriers to developing a long range plan for flooding and climate adaptation?
- How can short-term land management and acquisition enable better long term development? (also region and bayou scale)
- How can we better connect water resilience to other major shocks and stresses?

LIVING WITH AND WITHOUT WATER

Framing Questions

Bayou

- How can bayous and watersheds be an organizing structure for stronger cross-jurisdictional communication, planning, and data collection?
- How can decision-making be informed by a wider lens of factors (including ongoing coordination, climate projections, project funding, regulatory levers)?
- “space for bayous”
- How can we better integrate surface and subsurface water management (including subsidence issues)?
- How can the co-benefit approach of tying flood infrastructure with green space be pursued more broadly and systematically?

LIVING WITH AND WITHOUT WATER

Framing Questions

Neighborhood/District Scale

- Incentives for resilient development
- How can we develop a framework for buyouts (and land swaps)/elevation/adaptation with a goal of keeping flood-prone neighborhoods whole?
- How do climate and flood risks relate to health, transit, and housing opportunities in neighborhoods?
- How can Houston more concretely tie water resilience and flood protection discussions to discussions about equity and environmental justice issues?

Individual

- How do we address homes and structures built before floodplain regulations were put into place?
- How can Houstonians better protect their homes and belongings by reducing stormwater runoff on their properties?

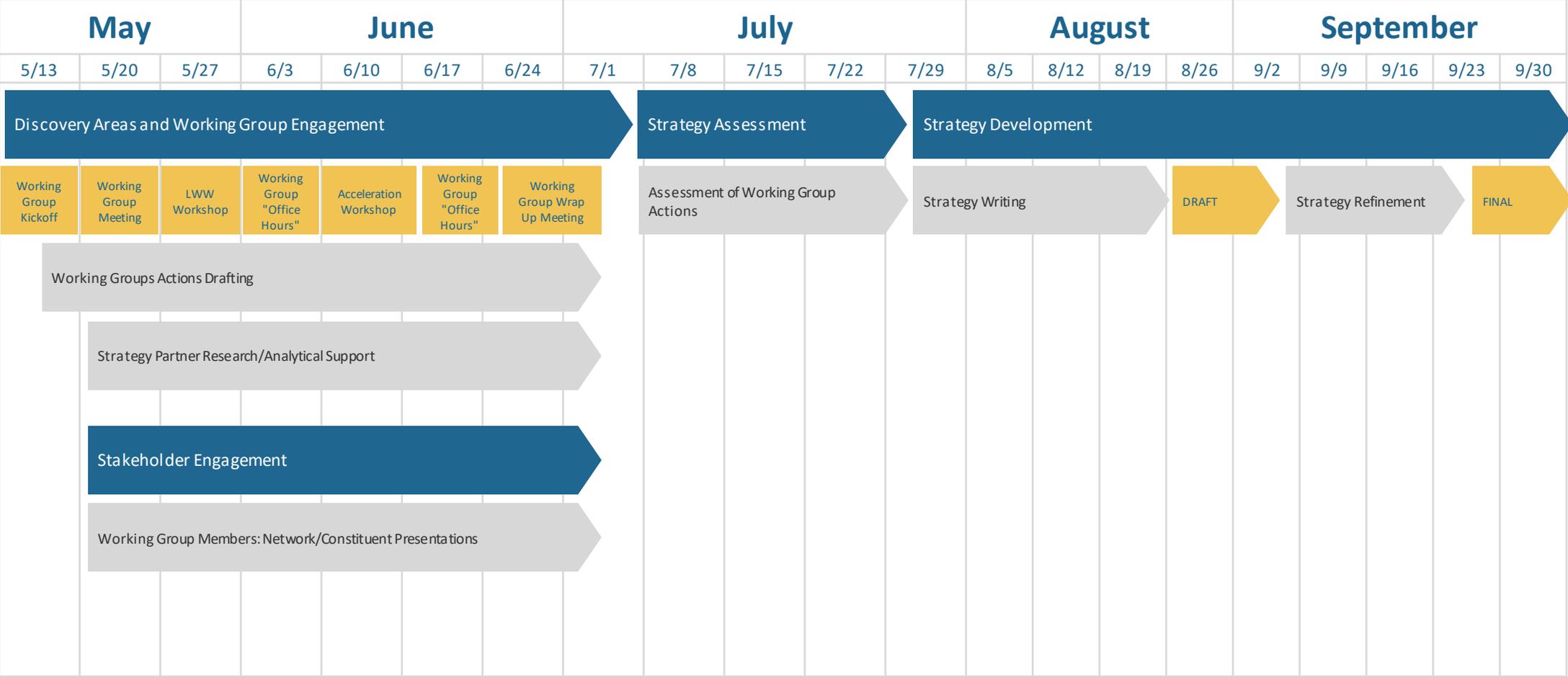
Across Scales

- How can we promote multi-scaled and integrated water planning and interventions from the region to the individual lot?

NEXT STEPS

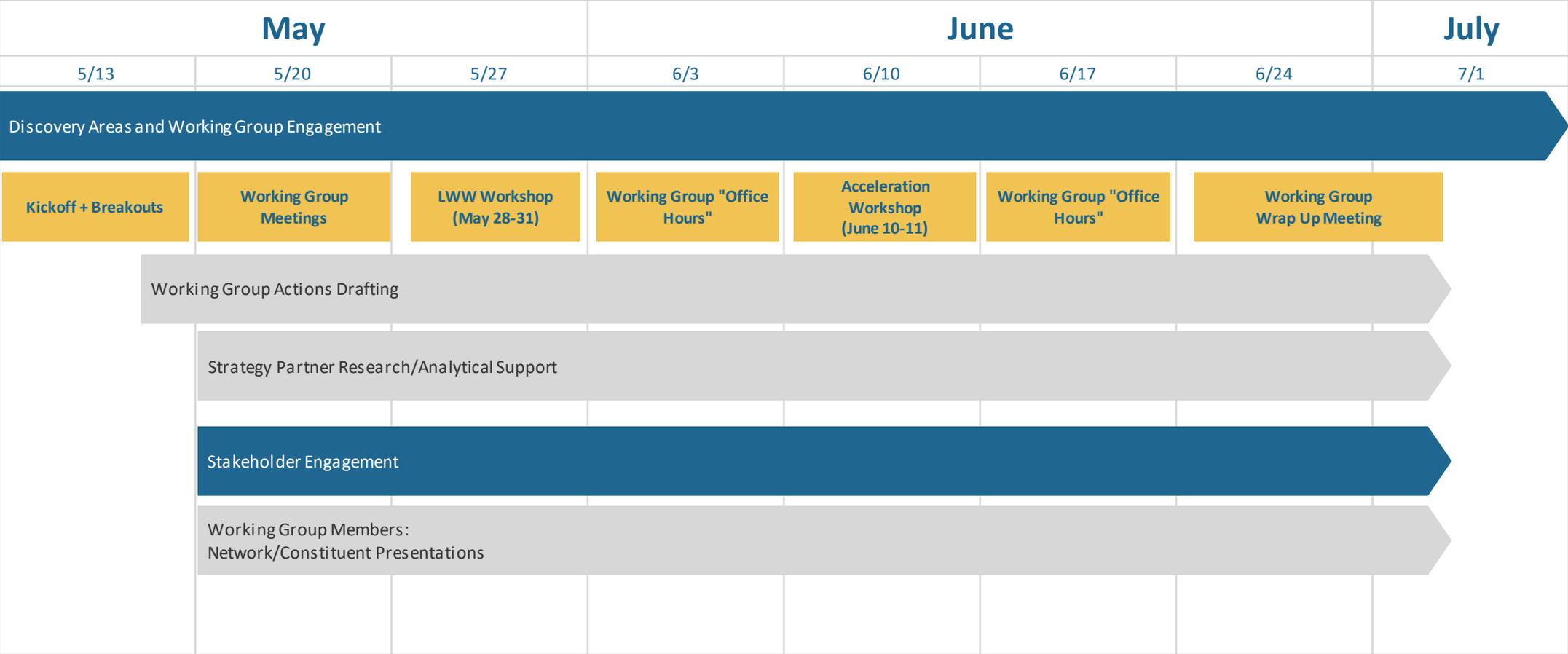
What is the Resilient Houston Phase Two Timeline?

Project Timeline



Phase Task Milestone Notes

Project Timeline



Phase Task Milestone Notes

Living With Water™ Workshop

May			
Tuesday, May 28	Wednesday, May 29	Thursday, May 30	Friday, May 31
Living With Water Workshop			
Day 1: Team Site Visits + Design Workshops	Day 2: Design Workshops + Open House	Day 3: Design Workshops	Day 4: Presentation to City + LWWOW Working Group Session
<p>MORNING</p> <p>Objectives</p> <ul style="list-style-type: none"> Familiarize design teams with site context <p>Format</p> <ul style="list-style-type: none"> Site visits <p>Attendees</p> <ul style="list-style-type: none"> Core Design Teams City Representatives <p>AFTERNOON</p> <p>Objectives</p> <ul style="list-style-type: none"> Begin design process, in focus area teams <p>Format</p> <ul style="list-style-type: none"> Design workshops <p>Attendees</p> <ul style="list-style-type: none"> Core Design Teams City & Houston Stakeholders 	<p>MORNING / EARLY AFTERNOON</p> <p>Objectives</p> <ul style="list-style-type: none"> Continuation of design work <p>Format</p> <ul style="list-style-type: none"> Design workshops <p>Attendees</p> <ul style="list-style-type: none"> Core Design Teams City & Houston Stakeholders <p>LATE AFTERNOON / EVENING</p> <p>Objectives</p> <ul style="list-style-type: none"> Opportunity for WG members, Super Neighborhood reps, and other invited public to provide input and participate in design of strategies underway <p>Format</p> <ul style="list-style-type: none"> Open house <p>Attendees/ Invitees</p> <ul style="list-style-type: none"> Core Design Teams All WG Members Super Neighborhood Alliance City Representation 	<p>MORNING</p> <p>Objectives</p> <ul style="list-style-type: none"> Continuation of design work CRO feedback <p>Format</p> <ul style="list-style-type: none"> Design workshops <p>Attendees</p> <ul style="list-style-type: none"> Core Design Teams City & Houston Stakeholders <p>AFTERNOON</p> <p>Objectives</p> <ul style="list-style-type: none"> Wrap up design work <p>Format</p> <ul style="list-style-type: none"> Design workshops <p>Attendees</p> <ul style="list-style-type: none"> Core Design Teams City & Houston Stakeholders 	<p>MORNING</p> <p>Objectives</p> <ul style="list-style-type: none"> Integrate preliminary designs and workshop outcomes into resilience strategy – with a focus on advancing draft actions <p>Format</p> <ul style="list-style-type: none"> Presentation of preliminary designs & Facilitated work session <p>Attendees</p> <ul style="list-style-type: none"> Core Design Teams City Representatives LWWOW Working Group
			<p>Phase</p> <p>Task</p> <p>Milestone</p>

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